ENGINEERING AND MINING JOURNAL

A McGRAW-HILL PUBLICATION

MAY 1948

Three Lions Photo

A geophysicist reads the magnetometer at a South African mining property

Communist Influence on the Mining Industry — Page 74

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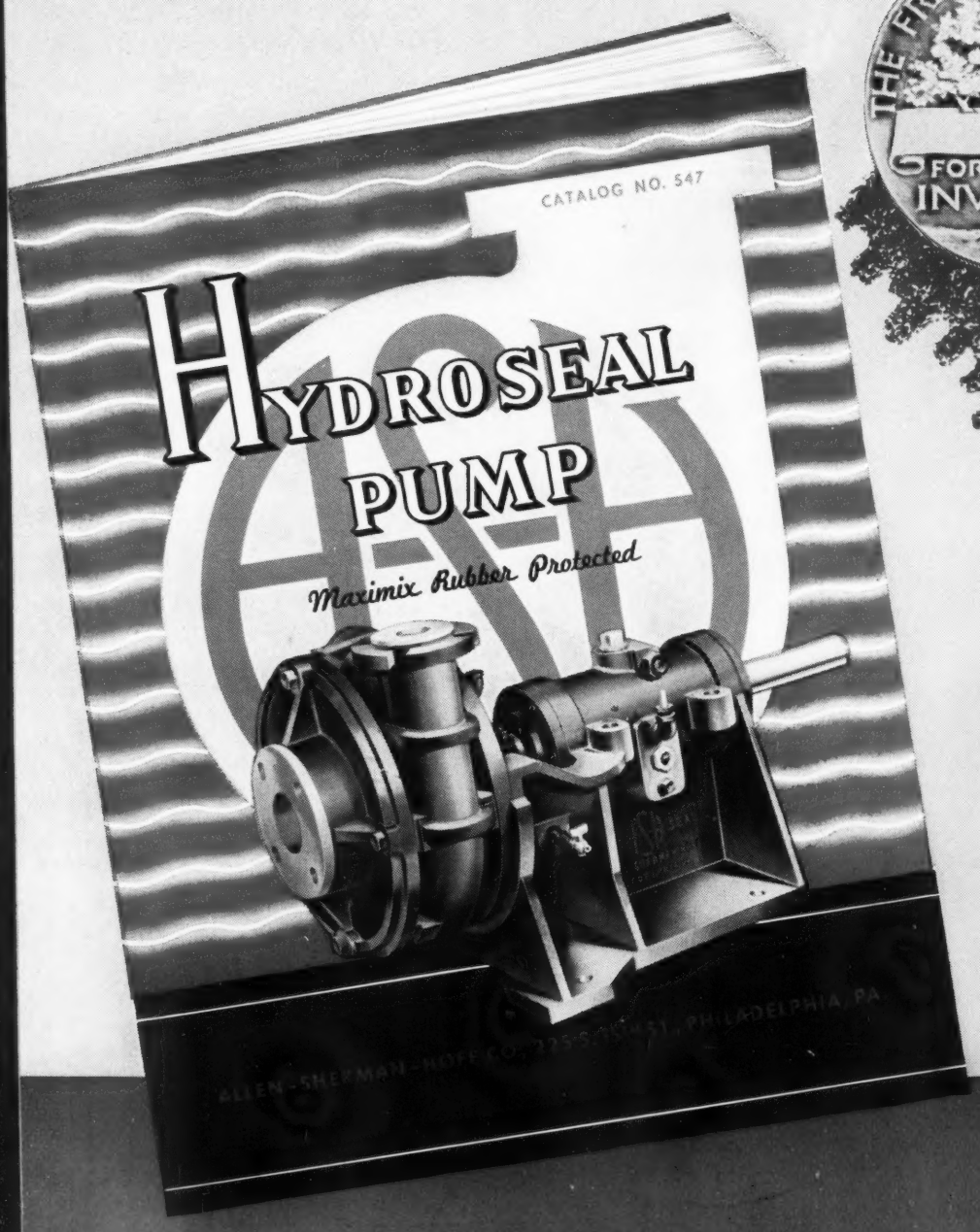

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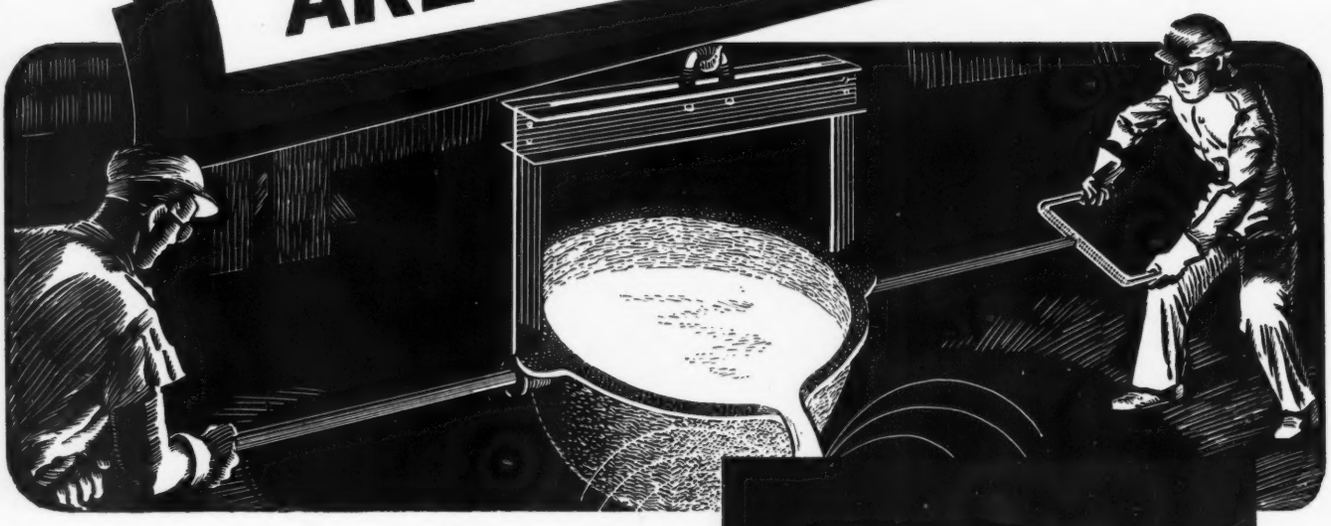

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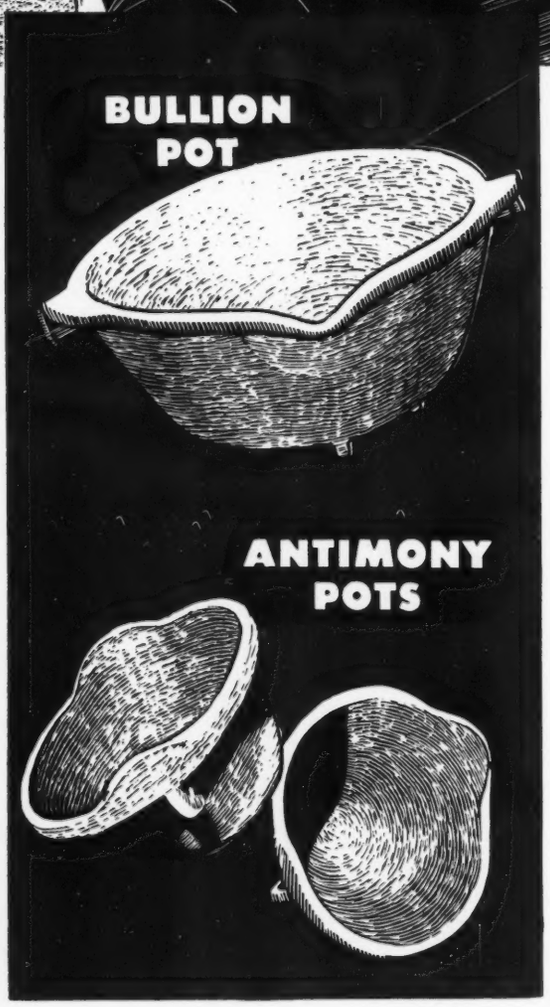

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MAY, 1948

New Ventures Deserve Special Encouragement

NOTHING COULD BE MORE conducive to fundamental national economic health today than to slash away some of the present deterrents to financial risk taking. Because mining deals with wasting assets, and new mining ventures are particularly risky, the problem is of particular interest to the mining industry. Nevertheless, the present discouragements to risk-taking affect all industry adversely. Thus, there should be some general relief given, as well as special concessions to venture capital entering mining.

We believe this problem to be so important that we are herewith launching a campaign to excite our readers out of a conversational mood into an active status over this problem. Almost everyone in the industry recognizes the problem, but we aren't obtaining remedies fast enough. The Tax Committee of the American Mining Congress has done and is doing an outstanding job. However, to get done what needs doing requires a greater interest in tax problems and their solutions on the part of mining operators.

Probably in any case, but particularly under the restraints of the Securities and Exchange Act, encouragement to venture capital tends to signify benefits to the wealthy. It is mainly the people with wealth well beyond their needs who can afford to finance risky ventures. True, the trend in recent years toward spreading the wealth has given the little fellow a lot of what he treats as risk capital, whether logically or not. But the little fellow in the main throws his surplus money away on horse races, lotteries, slot machines and other relatively hopeless gambles. If we expect people who use their wealth more wisely to make risky investments, there must be an opportunity to profit commensurately with the risk assumed. For our part, we are quite willing to see the better-fixed fellow get a break if the process helps to make jobs and to produce new wealth. The citizen who really has the most at stake in encouragement of venture capital is the man at the bottom of the economic pyramid, the one who lacks employment or who would be out of a job if the economy should falter. Sooner or later this will occur if new ventures are not developed.

We should examine with great care the arguments of left wingers who state or imply that the possession of wealth by some denies the rest of us something we should enjoy. If income taxes continue with such emphasis on "ability to pay" as to tax the wealthy out of existence, we may find that the apparent beneficiaries, the have-nots, are the biggest losers. The politicians who love to soak the rich to please the masses should be made to give a convincing answer to the question, "Who, then, is going to furnish new fountainheads of national wealth and employment by assuming the risks of new enterprises?" It is notable that the Communists, who are quite willing to sacrifice the fundamental interests of labor in order to undermine our national economic health, continue to fan the flames of prejudice against the privileged. With New Deal help, they have been able to create a public state of mind that regards profit and wealth as hindrances to social progress and tends to overlook their functions as energizers in our economic system.

Nobody who understands the extent to which our modern standard of living depends on minerals can be complacent about the present dearth of incentives to putting capital in new mining ventures. In our time, to become a mineral have-not nation automatically makes a nation economically weak and militarily vulnerable. Too few people realize that there is far more danger of mineral scarcity through lack of effective exploration and process research than through genuine exhaustion of Nature's storehouse. The mining industry has been delivering its products to society at prices less than replacement costs for so long that the public is unaware of the real cost of mineral production. Congress has not only imposed taxes and regulatory measures to such an extent that interest in new ventures is stifled, but has permitted the Treasury to chisel away at incentives by strained interpretations of tax legislation in a shortsighted drive to gouge the last possible penny out of each taxpayer. The Treasury, for its, part, stoops low enough to reverse the principles it applies against one taxpayer in order to extract maximum revenue from another. The pressure of taxation against enterprise is so strong that many well qualified students of taxation believe

a lessening of tax hazards to entrepreneurs would bring in greater ultimate total revenue to Government.

Regardless of the dreams of socialists, man is an acquisitive animal. Capitalism has succeeded in delivering living standards far beyond any achieved under socialistic schemes, primarily by taking a realistic view of man's character and making use of both his social and his selfish instincts. Until the theorists who would proceed otherwise do a better job of proving their ideas, we would do well to seek new ways of cultivating the acquisitive urge and diverting it into constructive channels. This is a time-tested method. We have merely to observe the predicaments of people who are trying out various forms of collectivism to get a forceful object lesson in the futility of suppressing man's natural selfishness and trying to proceed solely on social urges. Any successful society needs energizers. We have no basis for assuming that social urges alone can propel a dynamic, fruitful society.

Naturally, the most obvious way to improve incentives would be a drastic general lowering of taxes. Unfortunately such a course is infeasible with a huge national debt, a people beguiled into wanting costly benefits from the Government, and continued large armament needs. Therefore we are forced to the conclusion that the already over-complicated patchwork of taxes should be amended to provide some special concessions to venture capital. Suggestions which have been offered—and to which we subscribe—are: elimination of the double tax on dividend income, at least to the extent the income of the disbursing corporation was taxed; and the right to full deduction of capital losses, including generous carry-back and forward privileges. However, in our opinion, desirable as these proposed changes are, they are insufficient to stimulate an adequate flow of capital into new ventures under present conditions. Therefore, we urge in addition a special exemption of new enterprises from income taxation for three years from the time they reach the production stage, and in the case of new mineral ventures, five years. The tax losses to the Government from such a policy would be many times overtaken within a few years by the energizing effects of such an invitation to invest in new enterprises.

Zinc Outlook Is Encouraging

AMONG SEVERAL good papers given at the recent annual meeting of the American Zinc Institute (p. 107) two appraisals of the supply-demand outlook provoked considerable private discussion, most of which anticipated a higher price for zinc.

Richard A. Young, vice president of the American Zinc Co. of Illinois and manager of his company's smelter at Dumas, Texas, gave a detailed review of the domestic zinc smelting picture anticipating an adequate concentrate supply—one third from foreign sources—but very little likelihood of an increase in domestic metal production over 1947, particularly of ordinary grades. He looked for a domestic demand exceeding 800,000 tons, compared to a 1947 level of 776,000, as well as an impetus to exports from the European Recovery Program (ERP). Thus, ". . . there can be only one answer to the situation, and that is that there will not be enough domestic zinc in 1948 to go around and if consumers are to receive the quantities desired, there will have to be supplements from imported metal."

The decline in coal-fired (coal gas) horizontal retort plants production from 177,000 tons in 1940 to 142,000 tons in 1947, considered with an estimated "economic capacity" for 1948 of 99,000 tons, points to an economically weak situation which may call for price increases to sustain production.

On the other hand, Simon D. Strauss, sales manager of American Smelting and Refining Co., discussing "The World Situation in Zinc," stated that ". . . a sustained consumption of 700,000 tons a year for a period of several years must be regarded as a very satisfactory level in the United States, considering the high level of prices and the substitution in some uses of other materials for zinc." Anticipating a world supply outside the Iron Curtain of about 1,625,000 tons and an effective world demand in the same area of about 1,500,000 tons, he concluded that there should be "a substantial margin of metal production available for channeling into the United States stockpile." Strauss showed a current available supply of 810,000 tons in the U. S. and 798,000 tons in the rest of the Western world.

From Young's paper one could well anticipate a rise in the zinc price unless increased metal imports become available. Strauss' analysis, although pointing to a reduced demand in the United States over the long term, does not indicate any way of increasing imports, as he portrays Western world supply and effective demand outside the U.S.A. as in balance.

As for stockpiling, nobody knows how urgent stockpiling requirements may become during 1948. However, it is a fair guess that the stockpilers will not lend themselves to driving the zinc price up as long as their zinc stock is far out of balance with that of copper, the primary military need being for brass.

From the facts cited, we conclude that there is considerable possibility of an increased price for zinc, but that over the longer term there is likelihood of relaxation in the present rate of demand.

Secrecy Retards Technological Advance

GRANTED THAT SECRECY respecting a new process or procedure in its successive stages of development is justified until the customary steps for securing patent protection have been taken, one may well question how much profit there is in the long run for those companies that shut their plants to the rest of the industry and to professional visitors in general. Their explanation usually is that they cannot afford to let others see their work. They should note, however, that industry in the United States has profited from generous exchange of information. Long since, it has been demonstrated convincingly that in this exchange of ideas we have a major reason for the great and rapid industrial growth of this country. It is significant that the great growth of the technical and business press on this side of the water has paralleled the aforesaid industrial growth.

An increasing tendency to secrecy in the beneficiation of various nonmetallic minerals is noted and deplored. This was preceded some years before by an unfortunate relapse into secrecy on the part of various companies undertaking to recover secondary metals. A surprising instance of excessive secrecy respecting a large metallurgical undertaking arose in the latter days of the war, when a private company that had tackled the problem of recovering a certain metal from extremely low-grade ore, utilizing for the purpose a huge appropriation of public money, declined to release information that had been approved by the wartime Government agency involved.

Secretiveness is out of harmony with the broad generosity that, in the main has been a characteristic of American mining men and companies. The less we have of it in our industry the better.

Organize the Army of "Haves"

BY ORGANIZING the hordes of little stockholders and policyholders, management could put a stop to the pastime of using corporations as whipping boys for political purposes.

The forgotten man of our times is no longer the not-too-industrious citizen whose vote was assiduously cultivated by Messrs. Roosevelt, Hopkins and Wallace; he is one of a vast army of stockholders, bondholders, and policyholders who is defrauded of his savings with every upward twist of the wage-price spiral, every maneuver toward confiscation of property, and every free spending policy that piles up Government debt. This army has been kicked around so long that one wonders if it will ever evolve the necessary organization to utilize its latent strength. The customary postwar program of shearing the savers has been frankly consummated in Italy, Russia and France. These sheep have no chance whatsoever of getting through with hide and hair intact in this country, the sterling area, or China, but they might improve their relative status here if they would organize in self defense and demand something more than lip service to deflation.

Recent evidence of the vulnerability of this army was afforded by the President's "$40 and a mule" proposal in the budget message. This crass bid for votes in an election year with corporation stockholders as the sacrificial goats would never have been politically feasible if the multitudinous victims of higher corporate taxes would take enough interest to make themselves heard.

Because this army of victims seems to generate no leadership on its own account, it would be constructive and appropriate if corporate managements would make some efforts toward organization. Rallying of stockholders for mutual protection was proposed some time ago by Tom Lyon of Salt Lake City (*E&MJ*, Jan. 1947, pp. 77-78) but as far as we know the idea has not been given serious attention. In a system of government by pressure groups, this group, if organized, could exert influence second to none, and could certainly put a stop to its being used as a floormat by every other element in the commonwealth. Incidentally, such an organization might provide some answer to Macauley's statement that a democracy with a universal voting franchise is "all sail and no anchor" an accusation which we have done a good job of proving valid in recent years.

Confusion From Labor Difficulties

AS A RESULT of the troubles that have been widespread in the printing industry in recent weeks, the production of the May issue of *E.&M.J.*, as was that of the April issue, has been attended with difficulties and delays. The reader, it is hoped, will look at the pages with an indulgent eye, and if he notes places where composition and make-up depart from the *Journal's* customary practice, he will know the reason Irregularities in procedure are bound to be reflected in the product. The editors anticipate that there will be considerable improvement in the situation before the next issue is taken in hand.

Why Deal With a Union

The Facts Assembled for This Article . . . .

JOSEPH M. GAMBATESE
Washington Bureau,
McGraw-Hill Publishing Co.

MANAGEMENT in the metal mining and allied industries faces a grave decision in the next few months when its major collective bargaining contracts expire. The question for management to answer is this:

"Will you negotiate new agreements with a union if you believe that its leaders put the interests of Soviet Russia ahead of those of the United States or of the workers they represent?"

The answer to that question will do more than shape the mold in which the mining industry's bargaining relations will be cast. It may well affect the security of our nation and our ability to defend ourselves in time of war.

Before making up its mind on a question so momentous, mining management will probably ask two questions of its own:

1. SHOULD we refuse to negotiate new agreements with locals we know to be Red-dominated?
2. CAN we legally refuse to do so?

It is the purpose of this article to review briefly the facts on which the answers to the foregoing questions will probably be based.

Status of Local Reds

Never have Communists been so unpopular in the United States as they are today; not only because of what they have done, but also because of what they could do, and have done elsewhere. The threat of another war is quite apparent today, as is the identity of our potential opponent. In the event of war, how strongly could we count on the loyalty to the United States of our local Communists and their sympathizers? The answer to that is evident to anyone who can read or who listens to the radio.

Colombia, Chile, Brazil, Costa Rica, Canada, Italy, France, Czechoslovakia; in country after country we see clearly that the Communist's loyalty to Moscow transcends his loyalty to his own country. This is simply a matter of historical record by now, and needs no elaboration.

Congress, for example, is convinced that Communist labor leaders place the welfare of Russia ahead of most other things, particularly their fellow workers.

Aware of the danger lurking in some labor unions in this period of growing crisis with Russia, Congress, through the Taft-Hartley law, has expressed a national policy of removing Communists from influence in the labor movement. That is the intent of the non-Communist affidavit provision of the law, to protect both workers and public from Communist exploitation.

The privileges of the Taft-Hartley law, and there are still many of them for unions, are denied to any union whose officers do not submit affidavits to the National Labor Relations Board disavowing Communist Party membership and communistic beliefs.

Court Supports Curb

Most recently (April 13) a special U. S. District Court in Washington D. C. backed the Government's policy of exposing Communist labor leaders. In upholding the constitutionality of the affidavit requirement, the court majority opinion recognized that Communists having influence in labor relations "constitute a clearly discernible and imminent threat to important national interests."

Thus we have the legislative, the executive, and the judicial branches of the Government side by side on this issue. What about administrative agencies like the NLRB?

Elsewhere on these pages you will find anti-Communist views expressed by officials of the Department of Labor and the National Labor Relations Board. The NLRB in fact has gone all out to implement the national policy of weeding Communists out of union offices. Unions whose officers have not filed non-Communist affidavits have been denied a place on the ballot in plant elections conducted by the NLRB.

There is only one exception to this rule. That is when the union is the object of decertification. Then the NLRB will place the union on the ballot for the purpose of removing it as bargaining agent.

Inability to get on the ballot to be certified means that the union cannot negotiate a union shop contract, a maintenance of membership contract, or any other provision making union membership a condition of employment. (The closed shop is outlawed for all unions).

Mr. Denham, NLRB's general counsel, has warned employers that if they sign a union shop provision with a non-complying union (for example, any local of the Mine, Mill and Smelter Workers), "they will do so at their peril." That is, such employers will open themselves to unfair labor practice charges and possible law suits charging discrimination.

William Green, president of the AFL, and Philip Murray, president of the CIO, condemn Communism in no uncertain terms. They have been joined recently by several union leaders of conspicuous toughness and ability. Note the policy statement put out by Walter Reuther, head of the CIO auto workers. Similar views have been expressed by Joe Curran, of the CIO maritime workers, John Green, of the CIO shipbuilders union, and many others.

Ironically, the current idol of the Communists is their arch foe, John L. Lewis, who throws Communists out of his United Mine Workers as fast as he can identify them. Lewis is back in the *Daily Worker's* good graces (Communist Party newspaper) because he fights the Taft-Hartley law and because his coal strikes hamper the European Recovery Program.

From all of the foregoing, and more evidence that could be cited, it is apparent that the curbing of Communist influence in the labor movement is a definite and growing policy of our Government. It is evident, too, that this attitude is shared by the majority of the country's labor leaders. One and all consider the position of the Communists in labor as detrimental to our

Influenced by Communists?

. . . . Support Belief That You Should Not

An Editorial Statement

No one who is familiar with, and proud of, the achievements of the metal mining industry can fail to be disturbed by Mr. Gambatese's accompanying survey of communism at work in the Mine, Mill and Smelter Workers Union.

Whether we like it or not, the fact is that metal mining is one of the very few of this country's big basic industries that continues to furnish a refuge for the Communist Fifth Column and its fellow travelers. What, if anything, can be done about this problem?

Heretofore we have held the view that mining management could do very little about it, save perhaps by encouraging mining employees to clean house themselves. We have never doubted for a moment that the Mine, Mill rank and file is predominantly loyal. However, Communist sympathizers make up a tiny but very powerful minority in the union. We believe that only if the democratic majority is roused to action can the Communist minority be permanently curbed.

In time, the Communists may be ousted, but can we afford to take that time? In the light of the present world situation, we think not. Now, if ever, is the time for mining management to use the new power given to it by the Taft-Hartley law. Management can simply refuse to deal with a Communist-influenced union that will not, or cannot, comply with the law's provisions.

When Congress wrote into the Taft-Hartley law the requirement that union leaders must sign non-Communist affidavits to secure the law's protection, it had two aims in view. One, to help rid management-employee relations of the plague of Communist influence. Two, to protect the individual worker against Communist exploitation. By continuing to sign contracts with a local union that he knows to be Communist-influenced, an employer defeats the intent of Congress and denies to his employees one of the rights that is their due.

Indeed, he does much more than that. He invites continuance of the easy pickings Communists have found in the most extensive union in metal mining.

Suppose, to put it bluntly, we were forced into war with Russia. Who believes we could then dare to permit Communist sympathizers to continue to affect the union that mines this country's all-important non-ferrous metals? They would have to be removed no less surely than our Japanese citizens were removed from the West Coast in 1942.

To do this in the haste and tension of wartime would create great bitterness and make martyrs out of unworthy men. Therefore, let it be done now, while there is time for deliberation and orderly procedure.

But let us not be misunderstood. This is not a veiled attack on unionism. An attempt to convert a campaign against Communists into a campaign to smash a union can only fail in the long run. We believe the mining employee wants a union and he will get it in one way or another. We simply want to see his union led by loyal Americans.

To mining management, we urge that it give every encouragement to the union to develop leaders capable of fulfilling the intent of Congress. But if such leaders are not forthcoming, we believe management should refuse to deal any longer with men who continue to demonstrate their sympathy with the Russian dictatorship. The immediate consequences of such a step might be damaging, but failure to take that step may some day prove disastrous.

security as well as to peaceful employer-employee relations.

That being the case, let us go on to take a closer look at these things:

1. The complexion of the union most important to the mining industry, the CIO Mine, Mill and Smelter Workers.
2. The conflict over Communism inside the CIO, itself.
3. Some recent management experience with left-wing unions.
4. The implications of all this from the viewpoints of mining management and of the welfare of the country.

What about the leadership in the CIO Mine, Mill & Smelter Workers? In what directions has it led this union of more than 100,000 members?

In the July issue of *Engineering & Mining Journal* last year, R. H. Ramsey, associate editor, carefully catalogued the Mine, Mill record during the defense period and the war. The union flipped when the Communists flipped; flopped when the Communists flopped. It was against war, then for war, then for a second front to relieve Nazi pressure on Russia.

The pattern has been the same since the war. Both Mine, Mill and the Communists support the third party candidacy of Henry Wallace for President of the United States. Both oppose Marshall Plan aid to Western Europe. On several other national and international issues, Mine, Mill follows the Party line.

This does not mean that a majority, or even a very large number, of MMSW members are Communists —or that they hold communistic views. But it does mean that the rank and file is misguided and influenced by a small group of men

in the organization who at least sympathize with Communist aims. This element is aided by bona fide members of the Party, who filter into jobs in the mines and smelting plants at the Party's direction. These men handle the grass roots job of warping the views of the rank-and-file worker.

Who Runs MMSW?

Calling signals for the MMSW "brain trust" is a relative newcomer in the union, secretary-treasurer Maurice E. Travis, a big and brainy former lumberjack. Travis has been in the union only seven years. His rise to the top was surprisingly rapid. Two years after he was expelled from the CIO United Steelworkers in 1941, Travis turned up as executive assistant to Robinson, then president of MMSW.

The committee found that Travis and other officers "have allowed the influence of the Communist Party to interfere with the internal affairs of the International Union."

As to Travis in particular, the committee said it had proof "beyond question" that Travis "was continuously dealing with representatives of the Communist Party in shaping the policy" of the union. It pointed out that Travis had been expelled from Local 1440 of the CIO Steelworkers union on Feb. 13, 1941, for Communist tactics which disrupted affairs of this local, a part of the international union headed by CIO president Murray.

Travis failed to appeal the expulsion, the committee reported, but two years later turned up as assistant to Robinson. This occurred despite MMSW's "rich heritage, extending back for more than 50 years," from which presumably, someone with a longer record in Mine, Mill could have been chosen.

Travis was elected vice president in 1946, and on March 12, 1947, stepped into the top spot when Robinson resigned. This was just two days before the CIO executive board appointed a three-man committee to examine into the union's internal division. The biographical material released by Mine, Mill upon his becoming president made no mention of Travis' previous membership in the steel union .

In partial deference to the CIO committee's recommendations, MMSW held a convention in August in St. Paul at which a compromise slate of officers was nominated for election in an October referendum. To take off some of the heat, the Travis-Robinson forces put up a slate headed by John Clark of Great Falls, Montana, considered a non-Communist. In the vice presidential spots were Robinson for the East, and Wesley J. Madill of Garfield, Utah, for the West. Travis ran for secretary-treasurer. The rest of the slate consisted of nine candidates for board membership; one from each of the eight districts, and Kenneth Eckert of Toledo, director of MMSW's casting division.

This was supposed to be a "compromise" slate because it included Clark and Madill. Madill had been one of the leaders in the movement of right-wingers to secede from the union, but abandoned the fight in the interest of "unity."

Although an old-timer in the union, Clark had not gained any particular prominence until a year ago. He had worked in Canada, where he joined Mine, Mill's predecessor, the Western Federation of Miners, in 1908. He was secretary of the national wage policy committee, and financial secretary of Smeltermen's Local 16 at Great Falls when the MMSW executive board decided he was the man to fill Travis' vice presidency when the latter moved up to take Robinson's place.

Until Travis became secretary-treasurer this year, Clark also served temporarily in that post after the resignation last year of Charles Moyer of Pottstown, Pa. Moyer, an anti-Communist, had been elected to that office in 1946 with the support of both sides, but he didn't stay long. Moyer and district directors John J. Mankowski, of Waterbury, Conn., and Angelo Verdu, of East St. Louis, Ill., were the only right-wingers who survived the 1946 elections in which the Robinson-Travis clique increased its majority on the board from 7-5 to 9-3.

Secession

The secession movement, led by John J. Driscoll, of Waterbury, and aided by Verdu, Mankowski, and Madill, was a direct result of the 1946 elections. Driscoll, who had fought Robinson as early as 1942 when he ran against him for president, contested the results. He accused the opposition, which controlled the election committee, of irregularities in certifying voters. He was upheld in this view by the CIO investigating committee. Because of this and Communist interference in the internal affairs of the union, Driscoll led some 40 locals with 30,000 members out of MMSW under the name of Progressive Metalworkers Council.

The secession movement was concentrated in the Connecticut "Brass Valley," the Midwest, and in Utah. It collapsed somewhat in Utah with the return of Madill to the Robinson-Travis camp. Recently, however, there has been a revival of right-wing activity in that area (See news pages, this issue). This time the PMC is affiliated with the CIO International Union of Marine and Shipbuilding Workers, which took in the secessionists last February over the mild protest of the CIO organization.

The CIO investigating committee found that the 1946 election was irregular and that Travis and other MMSW officers permitted Communist interference with the operation of the union. It recommended that Travis step out of the presidency, that an administrative committee be appointed to heal the breach, with an election to be held after six months, and that the shipbuilding union withdraw charters issued to PMC.

The recommendations were approved by the CIO executive board, but were not compulsory because the vote was not unanimous. The matter was to have gone before the CIO convention in Boston last October, but was disposed of by the executive board a few days before when all but one of the more than 50 board members approved it. The lone dissenter was Clark. CIO President Murray decided not to bring the issue before the convention. That ended it.

Left-Wing Is Strong

The defection of right-wing groups from MMSW has left the Travis-Robinson forces more firmly entrenched. This was evident at last year's convention, which the Driscoll forces boycotted. The convention heard Rep. Vito Marcantonio of New York urge "unity" with "peace-loving nations, particularly with Soviet Russia," and went on record in favor of a third political party. Robinson predicted Wallace might lead a "people's party."

Last February, at Salt Lake City, the MMSW executive board endorsed Wallace and declared against the European Recovery Program. In both actions it went counter to national CIO policy, although a few months before, MMSW delegates to the CIO convention had praised "CIO unity" as the means of trade union prog-

ress. But something had happened in the meantime. The CIO executive board had decided against Wallace and called for support for the Marshall Plan. Murray had forced the issue over the objection of a dozen left-wing CIO unions.

As a result, MMSW will not cooperate with the CIO Political Action Committee. It will retain members' contributions for political activity, and run its own show. Most of the leaders are serving in the Wallace camp in one capacity or another. Clark is secretary of the Wallace labor committee. This committee plans to organize groups for Wallace in plants and mines throughout the country. It will try to raise $1,000,000 through worker contributions.

MMSW Under Attack

As a result of its policies, MMSW finds itself under attack by two groups. One is the group that seceded (the PMC), which is trying to get locals to disaffiliate from MMSW and bargain under the banner of the right-wing shipbuilding union headed by John Green. In the other are more CIO unions, chiefly Walter Reuther's auto workers, and the AFL.

MMSW has given the right-wing CIO boys a perfect opening by failing to carry out national CIO policy backing the Marshall Plan and opposing Wallace. The AFL, of course, is always ready to take advantage of any split within the CIO.

Angelo Verdu, a regional PMC director, is working fast out in Utah and Nevada with the help of the CIO regional director, Frank Bonacci. A number of charters have been issued to locals formerly affiliated with MMSW. MMSW's District No. 2, comprising locals in those two states, has disbanded. George J. Wilde, district president, has been made Nevada-Utah Representative for PMC. In accepting the post, Wilde said: "I am convinced the per capita tax paid by the membership to MMSW is being used by and large to further the interests of the Communist Party rather than in support of the principles of trade unionism to which I am dedicated."

Madill, MMSW Western vice president, had a different explanation. He said the district union had been made obsolete by organization of the more efficient company council system.

Considerable inroad on MMSW membership has also been made in Connecticut under Driscoll's leadership.

Reuther's auto workers have opened up on left-wing CIO unions like MMSW, the United Electrical, Radio and Machine Workers and the Farm Equipment Workers. The UAW-CIO says it is welcoming into its ranks any CIO groups that want to break away from international unions that are not supporting the CIO's policies. If they dont, Reuther says, they should leave the CIO entirely.

Phil Murray has frowned on the situation and has asked the feuding unions to get together and settle their differences around the table. Significantly, he has not been tough about it. In a letter to Murray, Reuther questioned the loyalty of some of the CIO leaders on the other side. Apparently alluding to the defense period before the last war when the Communist program was one of sabotage, Reuther wrote Murray: "No one in our union is under any illusions as to what is happening—history does repeat itself."

Rivals of MMSW are moving in wherever management is willing to stand up and fight the MMSW on the Communist issue. Some managements in the industry have done this. Some have encouraged other unions to take advantage of the situation.

The result is that MMSW has lost some strikes and stands to lose still others. The International Union finds itself in financial straits. The executive board has imposed a $1 assessment per member for strike purposes. The Casting Division strike relief fund contains less than $30,000.

At Dumas, Texas, MMSW has just lost a contract it signed in 1946 with American Zinc Co. of Illinois. NLRB has ordered an election held before May 15. Employees will vote for or against Dumas Smeltermen's Union, Local 842, CIO, which is a PMC local affiliated with the CIO Shipbuilders union. Mine, Mill can't get on the ballot. Actually Mine, Mill could not fight this one anyway because PMC had taken over the whole local.

Late Developments

On April 27, five Utah mining companies announced their intention to refuse to renew contracts with the MMSW international.

The companies are Park Utah Consolidated Mines, Silver King Coalition, New Park Mining, Combined Metals Reduction, and Newmont Exploration.

These companies said they would deal with their employees on a local basis, leaving it up to the employees to select their own affiliations.

A similar announcement was made by the Utah division of Kennecott Copper Corp. on May 3.

On May 4, a NLRB representative announced that the CIO Auto Workers had defeated the AFL, 368 to 269 in the election covering Precision Castings Company, Fayetteville, N. Y. There were only 22 votes for "no union," despite the fact that MMSW, barred from the ballot, plugged for a "no union" vote.

Losing Bargaining Rights

MMSW's toughest fight is with Precision Castings Co., which has decided not to bargain further with MMSW because it has not qualified under the Taft-Hartley law.

The union struck the Kalamazoo, Mich. plant, but couldn't hold the workers out. They went back to work without a union.

MMSW also struck the Fayetteville, and Syracuse, N. Y., and the Cleveland plants in March when contracts terminated. The company had little difficulty continuing production in the New York plants. In Cleveland, a back-to-work movement began after five weeks.

NLRB held a hearing in mid-March and on April 23 issued a ruling that wiped out the Mine, Mill local at Fayetteville by ordering an election between the AFL and the UAW-CIO. Thus Mine, Mill loses not only the strike but its bargaining rights as well because of failure of its leaders to comply with the non-Communist affidavit requirement of the Taft-Hartley law.

The company had agreed with the AFL and the UAW to a consent election to be held March 18, but it was called off and a hearing held by a trial examiner because of Mine, Mill's intervention.

Acting on the trial examiner's report, the NLRB criticized him for permitting MMSW to intervene in the situation. The Board's policy forbids a non-complying union to intervene in a representation proceeding unless it is to protect a contractual interest. In this case, the Board held that Mine,

What Leaders Say About Communists in Unions

HARRY S. TRUMAN, *President of the United States.*

"Congress intended to assist labor organizations to rid themselves of Communist officers. With this objective, I am in full accord."

Veto message on Taft-Hartley Act.

U. S. DISTRICT COURT, *Washington, D. C.*

"It would be unrealistic to say, in the light of all that appears, that the presence of Communists in key positions in labor relations does not constitute a clearly discernible and imminent threat to important national interests."

Majority opinion, April 13, 1948, declaring non-Communist affidavit rule of Taft-Hartley law is constitutional.

WAYNE L. MORSE, *Senator from Oregon.*

"I need not reiterate my opposition to Communists and their beliefs. I shall fight communism with all my energy because it destroys the liberties of free men. I want to say that communism must be stamped out of the labor movement of this country if we are to preserve the rights of free workers and protect the dignity of the individual."

PAUL M. HERZOG, *Chairman of the National Labor Relations Board.*

"No one who reads of the recent consequences of the Communists infiltration into European trade unions can question the critical importance of the target at which Congress aimed that weapon (non-Communist affidavits). The Board has been implementing the Congressional purpose of eradicating whatever Communist influences may be present in a few segments of the American labor movement."

ROBERT N. DENHAM, *General Counsel, National Labor Relations Board.*

"Communism does not sleep, and it does not stop at a momentary setback. The world events of the last few weeks impress more firmly than anything else could, the necessity for keeping our labor movement clean and clear of the scourge of communistic influences at all times. The corners must be swept out, as well as the middle of the floor that is always in plain sight."

Speech, Chicago, April 14, 1948.

JOHN W. GIBSON, *Assistant Secretary of Labor.*

"The Communists, through their domination of the Czech trade unions, were able to manipulate them to such a degree that when the proper time arrived, the unions, organized as "action committees," worked in conjunction with the Communist-controlled police to gain mastery over the country."

Before Senate Appropriations Subcommittee, March 22, 1948.

WILLIAM GREEN, *President of the American Federation of Labor.*

"By far the most effective weapon against Communist penetration and infiltration is exposure."

WALTER P. REUTHER, *President, CIO United Automobile Workers.*

"The inertia and indifference of the average citizen or union member are the most valuable assets the Communists have. Working as a well-disciplined minority, they cultivate this passivity and thereby seek to immobilize the democratic majority. . . . Exposure, not repression, must be our goal. We must get the Communists out of the political back alleys and walk them up Main Street in the full light of informed opinion."

Collier's Magazine, February 28, 1948.

EXECUTIVE BOARD, *CIO United Automobile Workers.*

"Those officers of certain international unions affiliated with the CIO who are willfully and consciously defying national CIO policy, are guilty of undermining the unity of the CIO, and of betraying the best interests of their membership and the American people."

Statement of policy, March 30, 1948.

Mill's contractual rights had expired on March 1, when it called the strike.

Loss of the Precision contract in Cleveland will be a bitter pill for MMSW to swallow. The plant was organized only after a long and costly struggle that involved picket-line violence, court injunctions, jail sentences for contempt of court, and loss of jobs for some workmen.

Other employers in other industries are refusing to deal further with left-wing unions. On the other hand, many are going along, making no issue of the Communist question.

Management must consider the world situation today and the urgent need to purge the Communist influence in the labor movement, or in any other place where it can undermine our security at the will of Russia.

The Communists try to worm into key industries. They have not been able to get a foothold in the coal mines or the steel mills because of stiff opposition from men like Lewis and Murray. But they

What NLRB Thinks of Dealing with Non-Complying Unions

ROBERT N. DENHAM, *NLRB General Counsel.*

"If they (employers) incorporate a union security provision, (in dealing with a non-complying union) they will do so at their peril; and of course the closed shop contract is specifically forbidden by law."

Letter to Lee Pressman, former CIO attorney.

"The decision strengthens the hand of the country in dealing with the Communists in labor. Every effort should be made to expunge the Communists from the labor movement."

Comment on Circuit Court decision, April 13, 1948.

CHARLES M. BROOKS, *NLRB Associate General Counsel.*

"Closed shop contracts are completely outlawed. Any other kind of union security contract, up to and including a union shop, is authorized, provided the election requirements as to non-Communist affidavits and financial registration have been met.

What if such a contract is made without the prescribed election? In that case, the employer subjects himself to an 8 (A) (1) charge (coercion of employees) by the mere making of the contract. If the contract is enforced, the employer is guilty of an 8 (A) (3) violation (discrimination) as well. If the enforcement is at the insistence of the union the latter is in violation of section 8 (B) (2) (causing an employer to discriminate). Consequently, the employer may be ordered to reinstate, and either, or both, the employer and the union may be liable for payment of back wages."

Conference, Newark, N. J., March 10, 1948.

How the NLRB is Handling Non-Complying Unions

In one decision after another, NLRB has hammered out a policy of maximum assistance to anti-Communists. In every case, NLRB has struck a blow against unions refusing to comply with the non-Communist affidavit requirements of the Taft-Hartley law. Here are the precedents established:

AS TO UNION PETITIONS

1. Officers of the parent federations, like the AFL and the CIO, do not have to file affidavits in order to qualify an affiliated union. (North Virginia Broadcasters.) Practical effect of this is to encourage compliance by individual unions and throw a spotlight on those that do not comply.
2. NLRB will not inquire into truthfulness of non-Communist affidavits. That is the function of the Department of Justice. (Craddock-Terry Shoe Corp.)
3. NLRB will not investigate an election petition filed by a non-complying union, even though the petition was filed before the Taft-Hartley Law became effective. (Rite-Form Corset Co.)
4. An intervening union that has not complied will not be given a place on the ballot. (Kinsman Transit.)
5. NLRB will not conduct a union shop election that is being sought by a non-complying union.

AS TO INDIVIDUALS

1. An individual petitioner need not file a non-Communist affidavit; the law applies only to labor union officers. (Acme Boot.)
2. An individual will not be permitted to "front" for a non-complying union. (Campbell Soup.)
3. A non-complying union will be placed on the ballot when the object of the election is decertification of the union sought by individual employees. If the union wins, it will not get a new certification. (Harris Foundry.)

AS TO EMPLOYERS

1. A non-complying union will not be placed on the ballot for certification even though a petition has been filed by the employer. (Herman Lowenstein; also Remington-Rand.)
2. Employer will not be ordered to bargain with a union not in compliance, although other types of unfair labor practices, such as discriminatory discharge, will be enforced if a complaint was issued before August 22, when the Taft-Hartley law took effect. (Marshall & Bruce.)

have gained considerable ground in metal mining and communications, both vital to fighting a war.

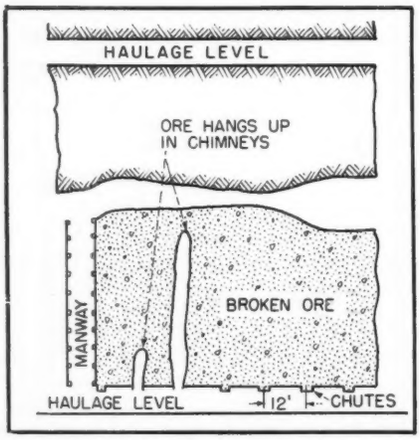
Employers with the will to resist Communists have the backing of the Government under the Taft-Hartley law. On this issue, this law gives strength to management and renders weak those unions having Communist influences.

Where management has been willing to fight the Communist menace through the Taft-Hartley law, it has been successful in throwing them out.

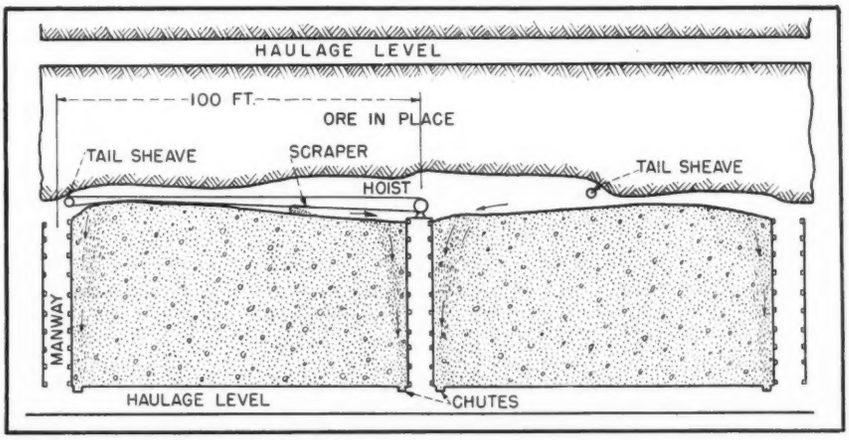
Management must be willing to stand a financial loss, and it also must consider the prospect that another union will replace the left-wing organization.

Life with another union, like the CIO auto workers, would not be exactly peaceful. But there would be one assurance: Its differences with management are more likely to be over strictly trade-union issues. Management will know what it is dealing with, what the issues are. Stalin's shadow won't darken the bargaining table.

SCRAPER TRAVELS around curved portion of steeply dipping stope. Note fine compact ore.



CONVENTIONAL SHRINKAGE METHODS failed because ore hung up in form of chimneys.



PROBLEM WAS REMEDIED by eliminating numerous shutes, and installing double-drum slusher hoists adjacent to raises to scrape ore into chutes as shown.

Slusher Solves Shrinkage Problem

GEORGE B. CLARK
Assistant Professor of Mining Engineering University of Illinois
and
WILLIAM H. HARRISON, JR.
Mine Superintendent Alcoa Mining Co., Rosiclare, Ill.

BECAUSE OF UNUSUAL characteristics of broken ore in shrinkage stopes in the Fairview mine of the Alcoa Mining Co., Hardin County, Ill., scrapers have been employed to draw ore from the top of the ore pile instead of from the bottom.

Fluorite occurs with calcite and minor amounts of lead and zinc sulphides in a fissure-type vein in sedimentary rocks of Mississippian age along a normal fault zone (Blue Diggings) which strikes in a general northeast-southwest direction and dips steeply to the southeast, with a branch fault (Argo) which strikes generally north-south and dips west. The thickness of the veins varies irregularly from very narrow veinlets up to mineralized zones 15 to 20 ft. in width. The average width of fluorspar stoped is about 42 in. and the minimum stoping width is 10 in. Although there has been considerable displacement on the faults, the wall rock has been relatively undisturbed and will stand unsupported in the stopes for long periods of time. A little slabbing may occur locally, but it is unimportant. Alteration of the wall rock or the ore by thermal solutions is very slight, and although there is evidence of post-mineral movement locally, in and across the mineralized fissures, its effect upon

SLUSHER HOIST installed over raise pulls fluorite ore into adjacent chute.

the strength of the ore and rock is negligible.

These five conditions, i. e., (1) relatively little disturbance of the wall rock by pre-mineral faulting, (2) very little alteration by mineralizing solutions, (3) slight amount of post-mineral movement, (4) a structurally strong vein complex and wall rock, and (5) the steep dip, have made the deposit suitable for shrinkage stoping.

The character of the vein material after it has been blasted is a critical factor in mine operation. Both the fluorite and the calcite tend to break into an aggregate which is composed predominantly of fine angular particles of these two minerals, together with some wall rock if the blast breaks into the walls of the deposit. (A 22-hole pyramid cut round is used in blasting drifts.) From the appearance of a drift face, there is seldom any over-breakage, the tendency being for the drill round to break about six inches short of the bottoms of the holes. The ore breaks so finely because of the softness, friability and cleavage of its constituent minerals. The resulting fine material packs readily into a compact mass. Angle of repose of the broken ore is very steep (about 75 deg.).

When the mine was reopened in 1941 and stoping was resumed, drifts were driven to develop the orebody for mining by shrinkage stoping, with manways spaced 100 or 200 ft. apart and chutes every 20 ft. along the main haulageways in the stoping areas. Mining was commenced from the sill floors (no pillars) and the bottoms of the stopes were floored with three-inch oak lagging on stull timbers. But even with a steep footwall it was found that the ore would not run. Excessive mucking was required to remove the ore from the stopes to make headroom to drill the stope backs. The broken ore had a tendency to draw into very steep sided chimneys (see illustration) and these sometimes refused to pull through to the top except in a slow and erratic manner. Careful control of ore-drawing and exchange of information regarding chute and bin conditions between the trammers and the miners was essential to prevent accidents because the miners had no way of knowing from the appearance of the muck alone whether it was solid or contained cavities. To correct these conditions, long boards and sections of pipe were kept in each stope to be placed over the site of a breakthrough. Draw-control sheets of each stope were kept, which itemized the number of cars drawn from each chute and showed whether the muck above the chute had pulled through to the top of the broken ore.

The interval between chutes was reduced to 12 ft., but this change failed to facilitate movement of the broken ore. When a stope failed to draw properly it was necessary to shut it down completely until the compacted ore could be broken loose either by the use of water or explosives. This in turn usually resulted in the stope being overdrawn, and staging was required to enable the crews to reach and drill the backs.

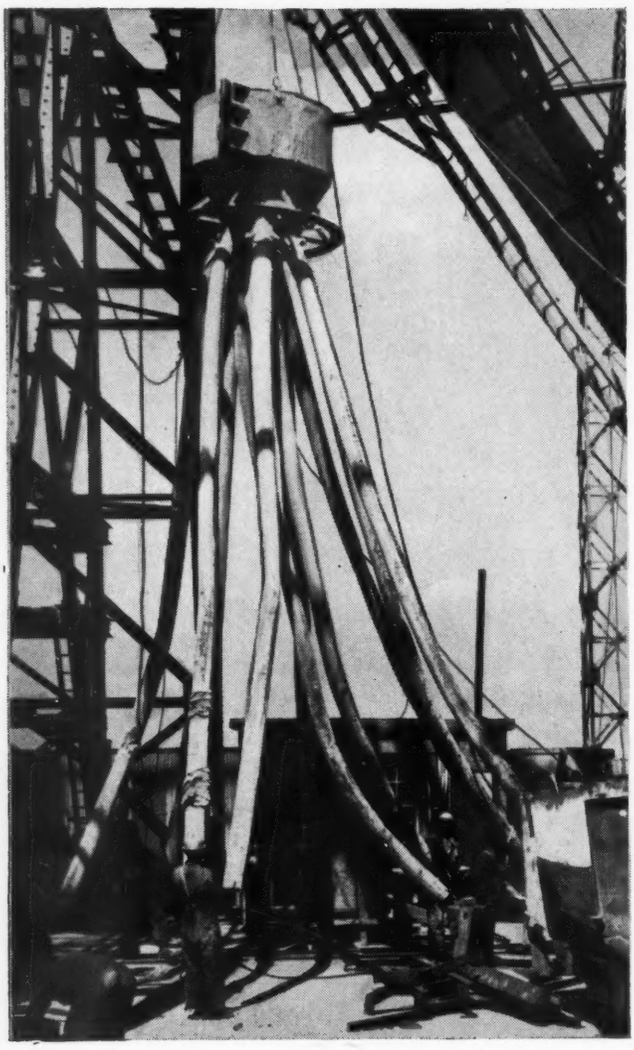
Many innovations were tried to solve this problem. A car of ore per shift was drawn from each chute to keep the muck loose and running. Miner shifts were doubled in the stopes to accelerate operations which required more frequent ore drawing. Drilling with both an excess of water and a small amount of water were tested, but none of these was successful.

It was then decided to adapt scrapers to the shrinkage method of mining. The proposed plan required the use of lined manways 100 ft. apart with a chute immediately on either side of the manway. (See accompanying illustration.) Small scraper hoists were installed on stull timbers at the top of the manways. From this position they scrape ore from 100 ft. of stope on either side of the manway into the chutes. This method eliminated six or seven chutes for each 100 ft. of stope, because the ore was scraped from the top of the broken pile instead of being drawn from the bottom. Enough ore was removed after each blast to allow about 7 ft. of headroom for drilling. After the stope was completed to the next level above, the remaining broken ore was removed in successive slices downward from the top of the stope.

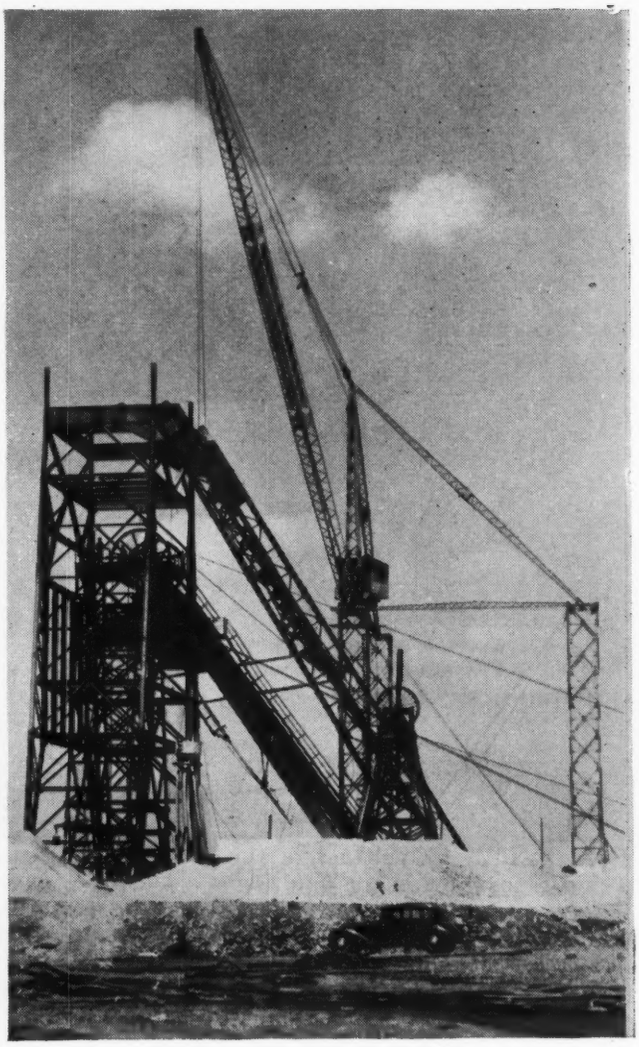
Several difficulties were encountered. Stope widths were as small as 30 in. and the footwall and hanging wall were very irregular in many places, but in spite of these obstacles the plan has proven very successful. The scrapers work well, even around a moderately curving footwall, and the narrow stopes are slushed as easily as the wider ones.

It has been found that one small air hoist will service about four 100-ft. stopes or 400 linear feet of the same stope. Slushing units consist of an Ingersoll-Rand, A5NN-OH, double-drum utility hoist, and a 26-in., curved-blade, Westecco, open-hoe scraper. With a double-clutch hoist it is possible to lift the scraper when it hangs on irregularities of the stope walls, or picks up too heavy a load.

The adaptation of slushing to shrinkage stoping in this mine has improved the safety of operating conditions in stopes, increased efficiency and reduced considerably the cost per ton of the ore mined.



OCTOPUS USED to pour concrete at Van Dyk No. 5 Shaft.



HEADGEAR ERECTS new shaft headframe over temporary one.

"Octopus" Speeds Shaft Job

KNOWN AS THE "Octopus," this device is used to pour concrete rapidly behind shuttering at the new No. 5 elliptical shaft of Van Dyk Consolidated Mines, Boksburg, South Africa. It consists of a 2 1/2-cu. yd. receptacle made of 3/16-in. mild-steel plate with 6-in. pipes welded into the bottom. From these pipes, ten hoses deliver concrete to different points of the shaft periphery.

The octopus is lowered before concreting starts and is clamped to the north pair of guide ropes, and all concrete is carried down on this side only, the south side being used for transporting bricks, etc. to the wall. Concrete is carried down the shaft in a 2 1/2-cu. yd. Blaw Knox concreting bucket, bottom discharging into the octopus.

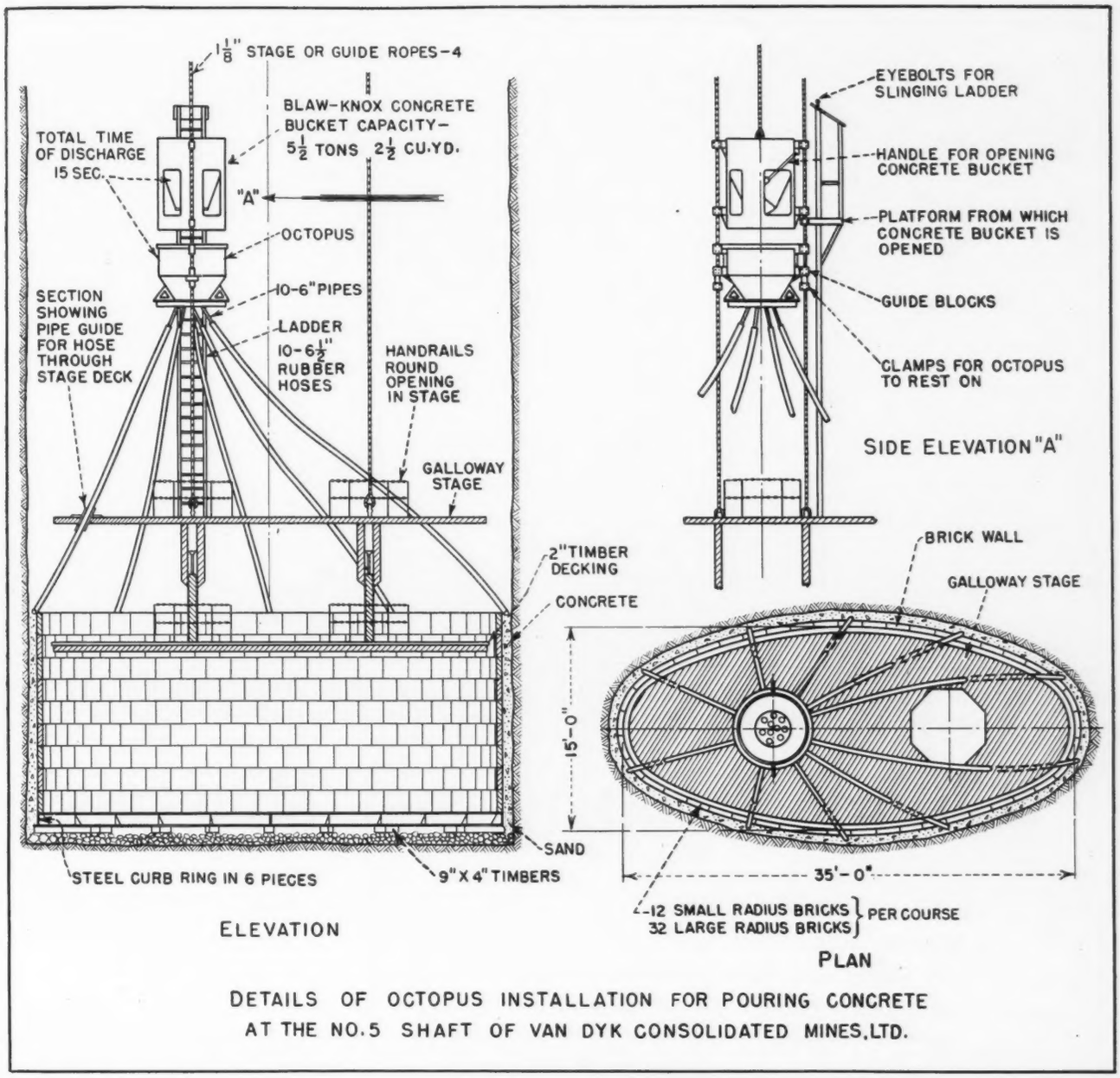
In this way, 2 1/2-cu. yds. of concrete can be placed in 15-20 seconds, while the Blaw Knox bucket returns to surface for another load. If there is an over-break at any point of the shaft, the supply of concrete to the hose can be cut off by inserting a wooden plug loosely into any pipe in the octopus.

Mr. T. L. Blunt, general manager of Van Dyk, feels that shuttering for lining shafts should, if possible, be permanent, i. e. made of concrete and left in position after the concrete lining has been placed behind it. Steel shuttering, when used, has to remain in position until the concrete behind it is set. This means a considerable waste of time for setting and stripping the shuttering.

Experiments were conducted using a brick lining but these proved unsatisfactory. Later a precast concrete brick was evolved, which could be installed by the sinking crew.

The bricks are 20x24x1½ in.—the height being sufficient to enable a worker to reach over the top and place T-pieces where side walls are tight. The maximum lift of bricks was 150 ft., and in bad grounds lifts of 15 and 20 ft. were installed. Time taken for concreting was about 1½ to 2 ft. an hour overall time.

Using the octopus, Van Dyk workers sank 302 ft. in June 1947. The shaft sinking is now complete at 3,953 ft. A sub-vertical shaft to be sunk is expected to be the same depth as the vertical shaft, and the lessons learned in the vertical shaft



DETAILS OF OCTOPUS INSTALLATION FOR POURING CONCRETE AT THE NO.5 SHAFT OF VAN DYK CONSOLIDATED MINES, LTD.

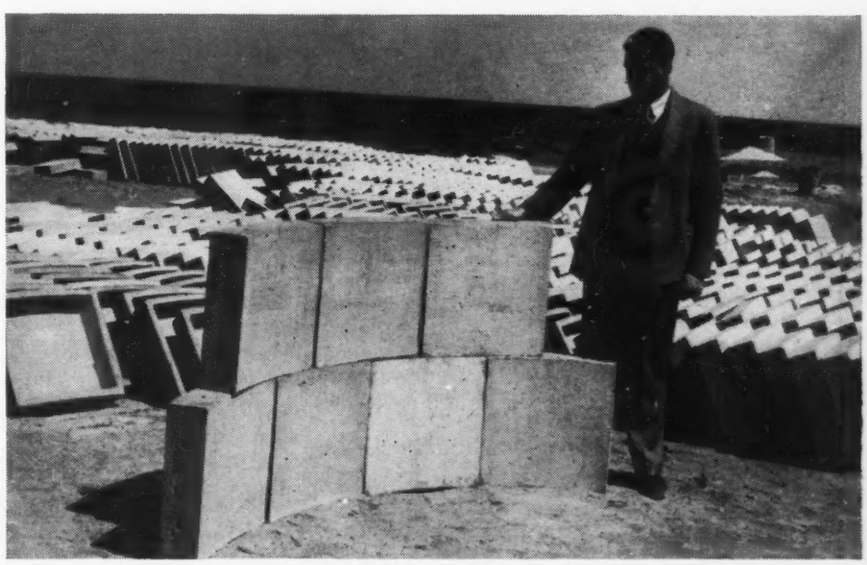
will be applied, including modified uses of the octopus.

Van Dyk engineers expect, once the technique of sinking by these methods is perfected, to advance 300 ft. a month, provided no water is struck. In June, when 302 ft. were achieved, the cost was only £54.93 a foot.

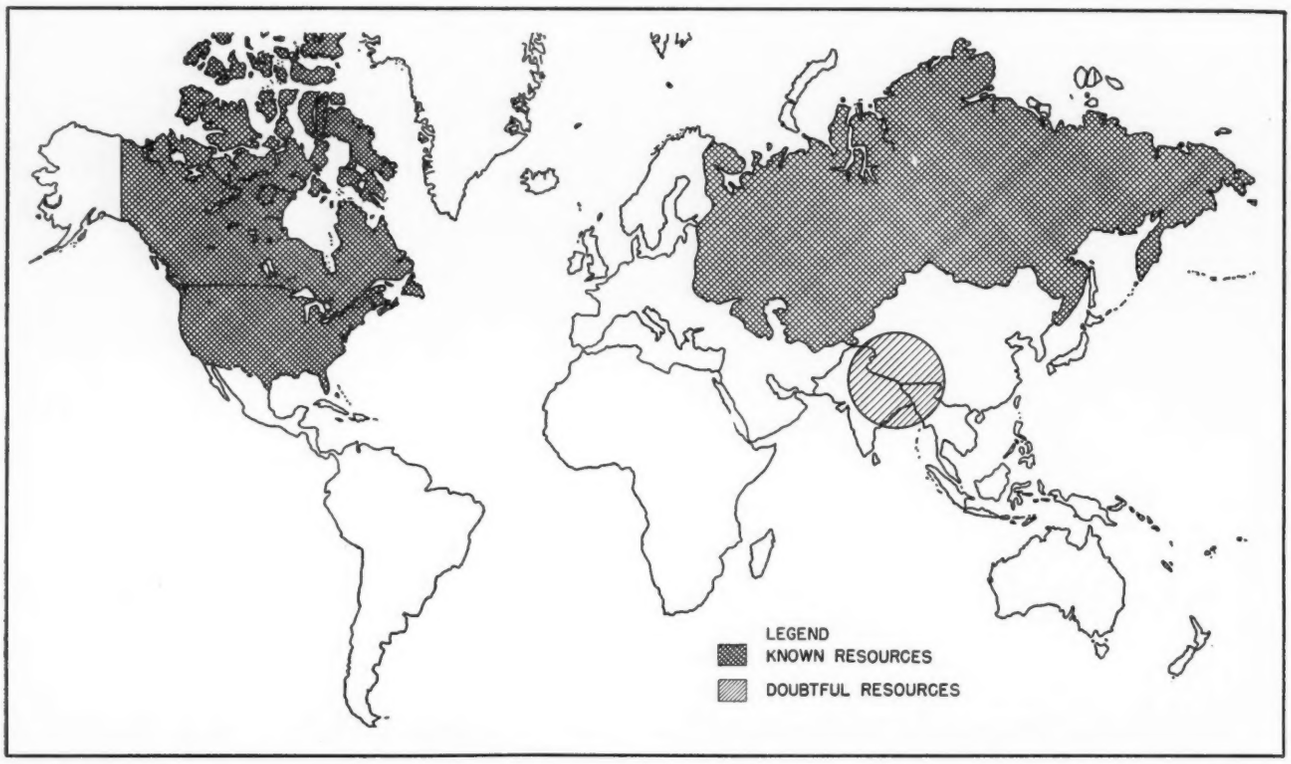
The cost of sinking 3,812 ft. up to the end of August was £328,595, of which £88,225 (or £23.14 a foot) was for sinking and £90,264 (or £23.68 a foot) was for concrete lining.

The total working force employed in shaft sinking was 25 Europeans, including one master sinker and three sinkers; and 98 underground and 16 surface workers a shift.

Photographs by J. P. Verster.



Concrete bricks are joined by ⅝-in. wooden dowels and metal T-pieces.



POTENTIAL SEATS OF POWER. United States, Canada plus Labrador and the Soviet Union have substantial known reserves of coal, iron, and petroleum. Those of China and India are doubtful unless combined.

Military Strategy and Minerals

Minerals Recommended for Stockpiling by Army and Navy Munitions Board

GROUP A—Materials for which stockpiling is deemed the only satisfactory means of insuring an adequate supply for a future emergency.

- Antimony
- Asbestos:
  - Rhodesian chrysotile
  - South African amosite
- Bauxite
- Beryl
- Bismuth
- Cadmium
- Celestite
- Chromite:
  - Metallurgical grade
  - Refractory grade:
    - Rhodesian origin
    - Other origin
- Cobalt
- Columbite
- Copper
- Corundum
- Diamonds, industrial
- Graphite:
  - Amorphous lump
  - Flake
- Kyanite, Indian
- Lead
- Manganese ore:
  - Battery grade
  - Metallurgical grade
- Mercury
- Mica
  - Muscovite block and film, good stained and better
  - Muscovite splittings
- Phlogopite splittings
- Monazite
- Nickel
- Platinum group metals:
  - Iridium
  - Platinum
- Quartz crystals
- Rutile
- Sapphire, and ruby
- Talc, steatite, block or lava
- Tantalite
- Tin
- Tungsten
- Vanadium
- Zinc
- Zirconium ores:
  - Baddeleyite
  - Zircon

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ONLY RECENTLY, Mr. Marshall, Secretary of State, commented that in its simplest form the foreign policy of the United States is concerned with those foreign conditions which affect, or could later affect, the future security and well-being of this country. Logically, this country should have a strategy of security. The employment of our or any country's armed forces in war is only a part—a minor part—of any such strategy. In this modern age of total wars, any war effort requires a total mobilization of both the tangible and intangible resources of a nation. I stress the word "intangible" because, in any total war, a nation's spiritual toughness and readiness are vital items. There is a psychological element in the strategy of security

*Adapted from a paper given at the mineral economics session, annual meeting of Am. Inst. Min. & Met. Engrs., New York, Feb. 19.

PEARL HARBORS OF THE FUTURE will be industrial plants like this refinery at Ploesti. Allied Air Forces did this in 1944. In the future there will be no period of grace to convert to a war status.

which is very important. It includes the will to be strong and must also include a willingness to bear sacrifices.

The actual employment of armed forces in war depends in considerable part on economic and political, as well as psychological, factors. The nature of armed forces, their size, their efficiency, and the capability of a nation to support them, all have roots originating many years or even decades, prior to the outbreak of war.

These preliminary comments are made for the purpose of cushioning any shock my next statements may occasion. It is impossible today, and will be in the future, to segregate into one compartment a set of plans labeled "military strategy". The smallest segregation one can hope to make for any nation would be entitled—"strategy of security" —and would include political, economic, and psychological factors inextricably entwined with considerations pertaining to actual employment of armed forces.

It must now be evident to every informed individual that security stems from maintenance in peacetime of a nation that is strong and healthy—politically, economically, and psychologically. To build up these strengths is foundational to any strategy of security.

COL. G. A. LINCOLN

The next objective is an adequate readiness for action in case of need. If we accomplish these two objectives—a strong healthy nation and readiness—we can hope that military action will never be required. Should military action become necessary, the modern world situation would require instant use of adequate military power if we hope to survive .

The United States is now considering an expensive program, commonly called the "Marshall Plan". The State Department presents it as being "a prerequisite to the maintenance of the civilization in which the American way of life is rooted." The tangibles on which that American way of life is based are dependent on mineral resources. Our standard of living, and hence the economic, and political health of this nation stems from minerals. U. S. consumption of minerals is now perhaps 30-fold what it was in 1890. That increase is in part explained by population growth. It principally reflects the rise in our standard of living and industrial leadership. Just to select one example, our type of civilization, now, and for some time in the future, is critically dependent on the internal combustion engine, which in turn depends primarily on petroleum. If this nation or any nation becomes poor in the minerals essential to our civilization, its economic and political health will certainly be threatened, if not shattered. Also, the basic implements of modern war depend on minerals. Readiness to maintain national security depends not only on organized military forces and equipment in being, but also, on available reserves with which to follow up. Any strategy of security

HERE'S WHAT HAPPENED to industrial centers in Cologne. In the future, mineral producing centers, even in the interior, may be subjected to similar terrific air force pounding.

is impracticable without this assurance.

I stress the modern situation because the importance of minerals to security is growing. Munitions requiring minerals were much less than 25% of industrial effort in the Franco-Prussian War of 1870, but over 75% of that effort in World War II. The progression in the future is obvious.

During the last century minerals became increasingly important, and nations used both political means and armed forces to obtain them. War and armed forces are, after all, merely implements of national policy directed toward long-range objectives. There are also many cases in military history in which seizure of mineral resources has aided the war effort of a particular nation. Germany obtained the oil wells of Ploesti, the Lorraine iron ores, and the bauxite deposits of Yugoslavia in such condition that they could contribute materially to her military effort in World War II.

However, the conquest of many such assets in wartime often does not materially assist military action. This statement is particularly true of mineral deposits, as there is a very considerable time lag required for their extraction and use. For instance, in World War II we deliberately gave up rehabilitation of the oil wells in the Dutch East Indies for supporting the invasion of Japan. I have made this point in order to indicate that the strategy of war sometimes may consider acquisition of the enemy's minerals to be an unremunerative military effort.

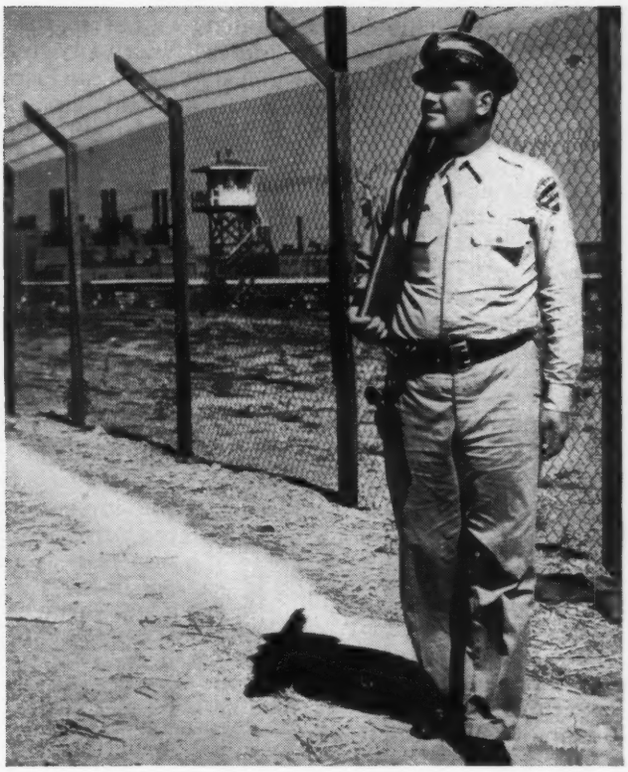
Stockpiling Is Essential

In order to preserve our security, any strategic plan must involve conservation of our own mineral resources in peace, and protection from enemy action in war. If war comes, these resources must of necessity be exploited to meet the war requirement — which usually means exploitation to the utmost. But no matter who makes the calculation, we cannot help but conclude that for two basic reasons, readiness for war can only be achieved by a certain amount of stockpiling. The first reason is that we are now dependent upon resources outside the United States for part or all of supplies of certain minerals. We are deficient in over 40 key minerals—over 75% deficient in some 30 of these. The second reason is that the demands of a war economy necessitate an immediate increase in consumption of minerals. This increase may be some 50%, as occurred in the case of petroleum in World War II, or it may be several times the normal peacetime consumption, as in the cases of vanadium and bauxite. A guess at an overall figure for World War II increase in consumption is 2½ times peacetime use. Also, in war time there is a need for rapid industrial conversion, which in turn depends on instant availability of key minerals. In addition to assuring ready availability of minerals, there is the problem of protecting our sources of production from sabotage, subversion, and direct attack. Up to this time these threats have not been very serious. They are probabilities for the future.

The destruction of an enemy's power to make war can be achieved nowadays by destroying his basic economic resources. Mineral-producing areas may be seized, as the Germans did in southern Russia, although undoubtedly minerals were only one of several factors determining the German plan of campaign. France was certainly handicapped in World War I by German occupation of the coal and iron areas of northern France and Belgium.

Strategic air power has now made minerals direct targets in war, whereas before World War II any

MINES ARE OFTEN POOR TARGETS. If so, railroads and plants serving the mines may become targets instead.



PROTECTION FROM SABOTAGE, or direct attack is no longer a theory in planning protection for plants.

immediate vulnerability of minerals arose only from the geographical location close to a hostile border. It is now possible to strike at interior sources of minerals, as we did in the great air raids on Ploesti in World War II. Quite often mines are poor targets, and it is more economical to strike at the means of transportation or at reduction and processing plants. The great air raids on the Ruhr in the last war amounted to hitting the minerals, particularly the coal and iron, in the blast furnaces and the foundries, rather than at the mines.

Minerals became a vital element in economic warfare in World War II, with each side seeking to obtain strategic minerals from neutrals for their own use, and to prevent these minerals from being purchased by the enemy. The great difficulty concerning Turkey in World War II arose in part over the question of who would get Turkish chrome—the Germans or the Allies? In the recent war minerals were an Allied political weapon. Countries such as Sweden, Portugal, and Spain were dependent primarily on the Allies for that critical item, petroleum, and perforce had to make some concessions to get it.

We can approach the strategy of mineral security from the standpoint of *time, distance,* and *mass.*

Today there is a vital change from previous decades in the time element. The United States, and for that matter, every other nation, has no cushion of time in which to make preparations, assemble mineral resources, or develop them. Atomic war can bring crippling destruction without warning. This means that supplies of the essentials must be on hand and not merely blueprinted for purchase.

Distance Is No Defense

The element of distance is also vitally important. Within a few years, if not now, any installation will be within range of strategic air power possessed by ourselves or by some other nation. Hence, dependence on single installations will be unwise unless there is a stockpile already available. Another aspect of distance is the tremendous problem of moving materials of great mass over any considerable distance. Even if there is no interference by enemy action, the effort involved may materially decrease the combat effort on the battlefield. For instance, it is highly questionable that we could ever have undertaken the war in India and Burma, maintained the "Hump Route" into China, or conducted the war in the eastern Mediterranean if we had not been able to base these activities on Middle Eastern oil, There were not enough tankers available to move the oil required for these military operations from Venezuela and the United States, even if we had enough oil from these sources.

The third basic element, mass, is equally vital with time and distance, in any strategic thinking connected with minerals. Coal, iron, and petroleum in the middle of South America or in the middle of Africa could be used, but their cost of transportation would have an adverse impact in peacetime on the standards of living in the populated areas of the world. In wartime, there might not be enough transportation in the world to get the required huge tonnages of materials to the right places at the right times, even if transportation routes were open. If the routes were closed, as we feared when the much discussed Canol project was started to support Alaska, then military defeat and destruction might be the result.

I would like now to return to my previous statement, namely, we must have minerals readily available in order to be adequately prepared. The time, distance, and mass factors require that those assets

must be physically in the United States if they are to be quick enough. Any suggestion that we will have time to go out and acquire them by purchase or conquest is fallacious.

Thus far I have deliberately spoken principally in generalizations which I hope have driven home the serious, immediate, and complicated nature of the security problem in its relation to minerals. A few specific examples may help to crystallize thought.

Dependence on Minerals

Because of lack of minerals alone, Greece is unable to maintain her own security. Turkey has no petroleum, and hence could not fight a war without allies or benevolent neutrals supplying it. This situation did not exist in World War I when the horse was still the motivating power for ground movement, and air power was not predominant. Italy without iron, without petroleum, and with her one coal mine worth mentioning a gift to Yugoslavia by the peace treaty, would be helpless alone. France, Belgium, and Luxembourg, without adequate coal to match their iron, have a grave weakness. Southern China, particularly the Shanghai area, depends on northern China and Manchuria for coal. Our power would be seriously impaired without minerals from South America and also from the British Empire and Africa. This dependence is dangerous and can be very costly. It has developed in the last 25 or even 10 years. One example of our dependence and its cost in the war—we flew four million pounds of tungsten a year over the Hump from China to India for the use of U. S. industry.

Petroleum Shortage

The oil in the Middle East supported our war effort from Libya eastward in World War II. Its vital strategic value today stems perhaps, not from any certain usefulness in war, but from the overall shortage of petroleum which is developing in the world. Our expanding requirements will call for all the exportable surpluses of our Western Hemisphere neighbors. Western Europe's economy in peace and perhaps in war will be keyed to Middle Eastern petroleum and a synthetic supply. Any nation which depends on synthetic oil must face not only higher costs but greater vulnerability to attack.

There appears to be no way in which any great power in the world today can become self-sufficient in all the important minerals unless it embarks on a combined program of conquest and of development of submarginal deposits. Because of the element of mass—I have mentioned, it would seem that no power can be really great, unless it has within its borders deposits of those minerals (coal, iron, and oil) which are required in millions of tons in wartime. The U. S. is not only becoming less self-sufficient in oil. The last of the high grade iron ore will be gone in the next several years as well perhaps as the last of the low-cost copper. In the next category there is a large number of minerals, approximately 30 to 45, which are comparatively minor as to the quantity required, but nevertheless essential. They provide the quality of industrial effort necessary for supremacy. The United States must reasonably meet the requirements for these minerals by conserving its own resources, by improving technology, and by stockpiling to assure the ready availability which I have mentioned before; also, probably by increased dependence on foreign sources in peacetime to assure conservation of our own supplies.

Mineral Diplomacy Needed

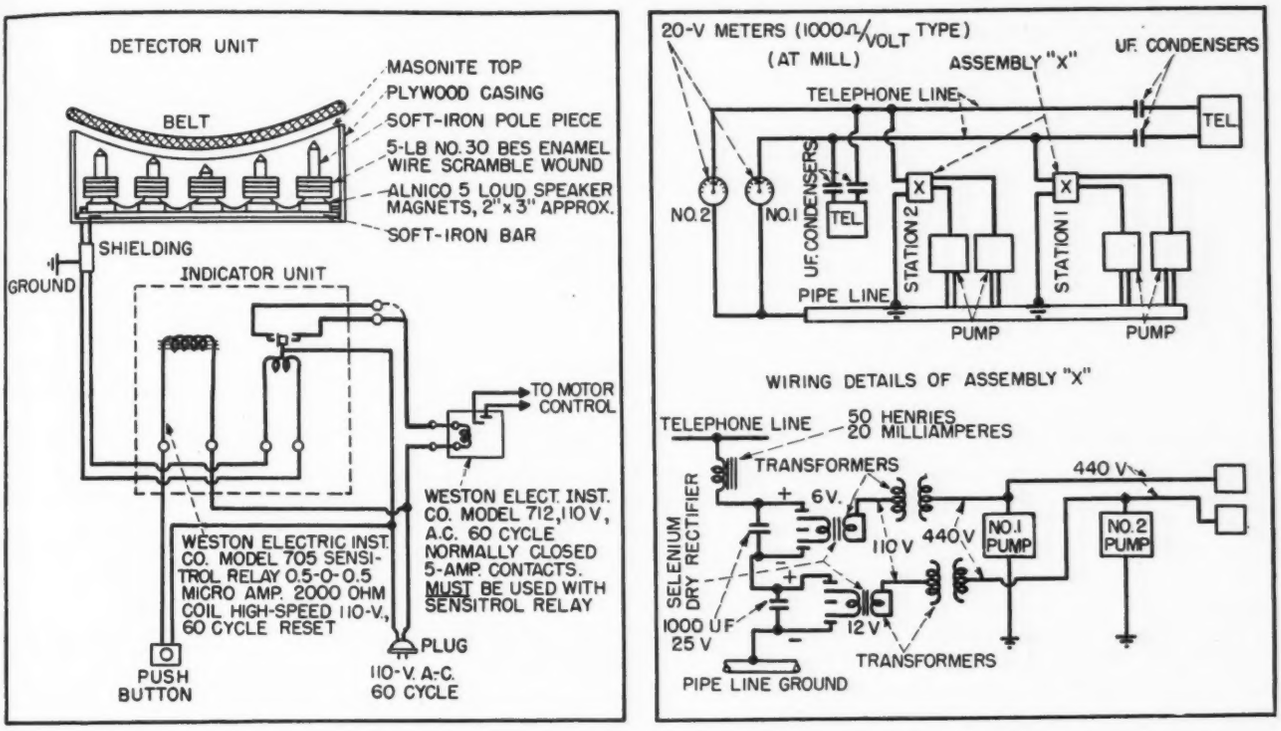
This last point is already deeply implanted in the minds of our leaders. Witness the various suggestions which have been made concerning the acquisition of raw materials from foreign countries in return for aid given under the Marshall Plan. In mass the greater proportion of these come from the Western Hemisphere. In value, even though weighing only pounds or carats a great proportion comes from south of the 38° parallel in Africa and Asia. Lack of self-sufficiency in minerals would have forced us to abandon isolationism even if there had been no World War II and no cold war—or forced us to abandon the way of life which is dependent on these minerals. Europe, the U. S. and Russia must in cooperation or competition depend on Asia, Africa and South America for many essential minerals.

We can expect that international relations from now forward will contain much "mineral diplomacy". This mineral diplomacy will take many forms. There will be the attraction between areas whose resources are complementary, for instance, French iron and German coal. There will be a struggle for economic association with, or outright political satellization of, small countries which possess important minerals. For instance, I can think of no one element which would make the present troublesome situation in Greece any more difficult than would the discovery of uranium on Mt. Olympus. Let us devoutly hope such a misfortune will not occur.

Uranium, and to a lesser extent, thorium, are obviously among the most important minerals in the field of national strategy. It is probably fortunate for the peace of the world that today we know *publicly* of only four sources which have been remunerative for their extraction. These sources are, of course, in northern Canada, Colorado, Czechoslovakia, and the Belgian Congo. Colorado and Czechoslovakia have been only minor sources. There is, of course, much speculation as to uranium ores in the U. S. S. R. The Soviet Union has not, since 1942, made public its geological surveys. Excellent and quite complete surveys, made public prior to 1942, do not show that the Soviet Union had found any important deposits prior to that date. It is worth consideration that the known long processing procedure for uranium makes producing areas less vital to the early employment of armed forces than most people might think. The processing plants themselves appear to be the best targets .

Mineral Policy Is Vital

Minerals, strategy of our armed forces in war, and the national program by which we maintain our strength, are mutually interdependent. Confused thinking on this point or delay in accepting it will invite catastrophe. When you, as experts, are discussing the technical details of some seemingly isolated matter, such as the home production or the stockpiling of manganese, you are discussing the security of the United States. That security is as much a responsibility of the citizens who deal in minerals and determine U. S. policies in minerals as it is the responsibility of military personnel. You will be held accountable by history and by rising generations of Americans for the ways in which you have conserved or dissipated these basic elements of the American way of life and the security of the United States.



PROTECTION is furnished by this tramp iron detector (left), and pump operation indicator (right), both from Nevada-Massachusetts.

Two Ideas for Mill Control

MILL OPERATORS today are looking for automatic control devices to help them hold back operating costs in the face of constantly rising costs of labor and materials. The staff of Nevada-Massachusetts Co., operating tungsten mines and a 400-ton mill at Tungsten, Nev., furnishes a good example of this.

Here, two control devices have been installed at the concentrator with good results. Both units were designed and constructed by Richard Segerstrom, who heads the company's research laboratory at Sonora, Calif.

The first device is an electromagnetic tramp iron detector, used on the conveyor belt between the coarse-ore bin and the primary crusher. It will stop the belt when anything magnetic passes through the detector zone, so that the operator can remove the object, which might otherwise go on to damage the crusher. Any steel fragment large enough to endanger the crusher will trip the detector and stop the belt, whether it is of manganese or of mild steel. Once, a miner lost his watch underground, and it was picked up later, still running, when it tripped the tramp iron detector.

The apparatus is sturdy, yet portable. It does not surround the belt; it requires no radio tubes; it is very sensitive; and it is not affected by vibration, voltage, or current changes. It responds with the belt traveling in either direction.

Shown in detail in the drawing, the complete device consists of a detector unit and an indicator unit. The magnetic field is perpendicular to the belt, and its lines of force are cut by any steel or iron object moving on the belt. A small current is generated that is inversely proportional to the distance to the ferrous object on the belt. This provides a limit to the sensitivity of the device.

Indicator Stops Belt

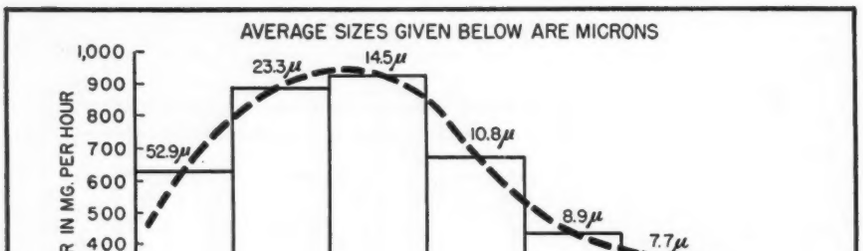
The indicator unit consists of a Sensitrol relay, built by Weston Electric Instrument Corporation to Mr. Segerstrom's specifications, and a Weston Model 712 contact unit. The Sensitrol relay is the heart of the control. It is so sensitive that ½ cycle of the current generated by the detector unit is enough to stop the belt.

Once closed, the relay requires manual resetting. The steel or iron fragment on the belt must be removed before pressure on the reset button will release the detector and allow the belt to start again.

The second control device is an indicator to monitor some pumps that serve a water supply system about four miles from the mill. As shown in the drawing, the signal system uses the telephone wires already installed between the pumping plant and the mill. This is done by placing condensers in both lines at each telephone to isolate the telephones, and by installing chokes (inductances) in the indicator lines to separate the d. c. circuit from the voice circuit.

Each pump, while running, places a d. c. voltage between the telephone line and the ground, which is the pipe line. A distinction can be made between pumps because the voltage applied to the line is different for each pump.

For example, pump No. 1 puts six volts on the line; pump No. 2, twelve volts; the two pumps together add 18 volts. Thus, a voltmeter at the mill, properly calibrated, indicates exactly which pumps are running. Line losses are relatively unimportant, as long as they are stable.



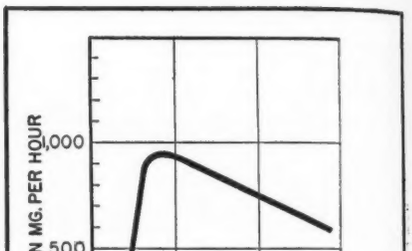


FIG. I. Shows that wear on grinding balls first increases, decreases, as grinding time increases and ground product gets finer. FIG. II. (Right)—Shows that greater wear on grinding balls is produced by very fine sizes of quartz, here at 0.017 mm. average size.

Toward Decreased Ball Wear

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RATE OF WEAR OF BALLS in a ball mill has recently been attracting increased interest. In 1940, I reported (1) tests that demonstrated that Davis' (2) theory, that wear of balls is proportional to their weight, must be erroneous. My work indicated that the wear should be regarded as proportional to the ball surface, with the reservation that a diverging result might be caused by special factors, such as the special shape of the Hardinge mill.

About the same time, Bond (3) announced that he had found that wear is proportional neither to the ball weight nor its surface. From his formulas, the conclusion must be drawn, however, that ball surface is of at least considerably greater importance than ball weight, Prentice (4) subsequently presented results that agreed with my earlier investigations, and Taggart's Handbook now states (with reference to Prentice) that ball wear is proportional to ball surface.

Proceeding from this assumption, and applying it to cylindrical mills, it is possible to derive the following simple equation from a running mill. Weight of the ball charge is Q (metric tons); size of balls added is d (dm); ball wear, or consumption of balls recomputed into balls fed per unit of time is q (kg. per hour); and half the reduction of diameter per unit of time is the "wear coefficient" (microns per hour).

Q equals (q x d/ 8u)100

For grinding Swedish ores in cylindrical ball mills with a diameter of 1.8 to 2.6 meters, u has proved to vary usually between 9 and 16, in extreme cases, between 5 and 23.

Recently, Timmermans (5) has reported data that indicate that size distribution and proportion of large and small balls in a ball charge affect the wear of different sizes of balls. It is further understood from his tests that the amount of wear is dependent on the grain size of the loading material and of the ground product.

With reference to this latter point, a description is given in the following text of experiments made to study the relationship between grain size of the loading material and wear on the balls.

Effect of Grain Size

These tests, which form part of a longer study of ball mill grinding, used 1,608 g. of carefully-cleaned quartz, minus 0.5 mm. in size, with an average grain size of 0.078 mm. This was ground in a porcelain mill of 19 cm. diameter and 15.5 cm. length. Grinding medium was 75 steel balls, 25.5 to 26.5 mm. in diameter, weighing together 5,359 g.

After one hour's grinding, with the mill rotating at 67.6 r.p.m., the mill was emptied, the balls weighed, and the average size of grain in the quartz was measured. This was done by surface measuring with passage of an air current by a method developed at the mineral dressing laboratories of the Royal Institure of Technology, Stockholm. It is based primarily on the work of Kozeny (6), Carman (7), and Rigden (8).

Grinding was repeated during several similar periods. It was then proved that the wear per unit of time increased rather rapidly up to a maximum, from which point there was a somewhat slower diminution of wear as the grinding time was increased. (See Fig. 1.)

These data also show that there is an abrupt decrease in wear in relation to average size of particle being ground. (See Fig. II, which is an extension of Fig. 1.)

This test was repeated, both tests giving equivalent results. The average grain size was computed as an arithmetical mean between the grain size before and after each grinding period, determined through surface measurement.

Under these conditions, the quartz produced the greatest amount of wear at an average grain size of approximately 0.017 mm. A great deal seems to point to the relationship shown by Fig. II as possessing general validity. The amount of wear and the position of the maximum point naturally are subject to a series of factors that need to be more closely investigated.

It is clear, however, that the connection established constitutes

an important factor in the study of wear of grinding balls. For example, it is evident that in an operating mill, where the grain size is coarser in the feed end than in the discharge end, the wear must be of a different character for fine and coarse balls when the mill is of a type to cause segregation of balls according to size.

One must remember, too, the different arrangement of the balls in a continuously working ball charge containing a whole series of ball sizes, as against that of a test charge composed merely of two or three sizes of balls in varying proportions.

In particular, the diagram of Fig. II gives an indication of how ball wear can be reduced in mills working in closed circuit with a classifier or a screen. If it is indeed true that extremely fine sizes produce the greatest ball wear, as shown in Fig. II, one can reduce wear by eliminating these finer sizes rapidly. This places increased efficiency of separation, so that the circulating load will be effectively cleaned of accompanying fine material, say, below 200 mesh.

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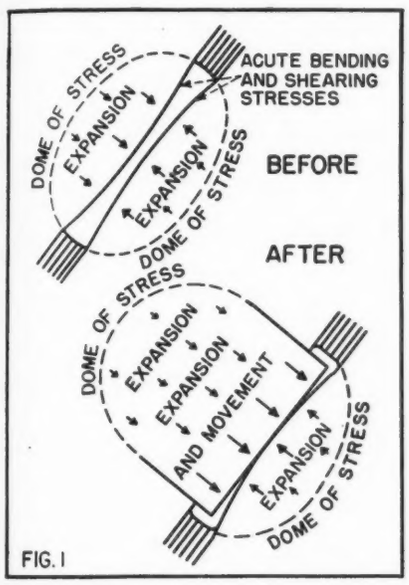


ROCKS FAIL in shear when bending stresses become excessive.

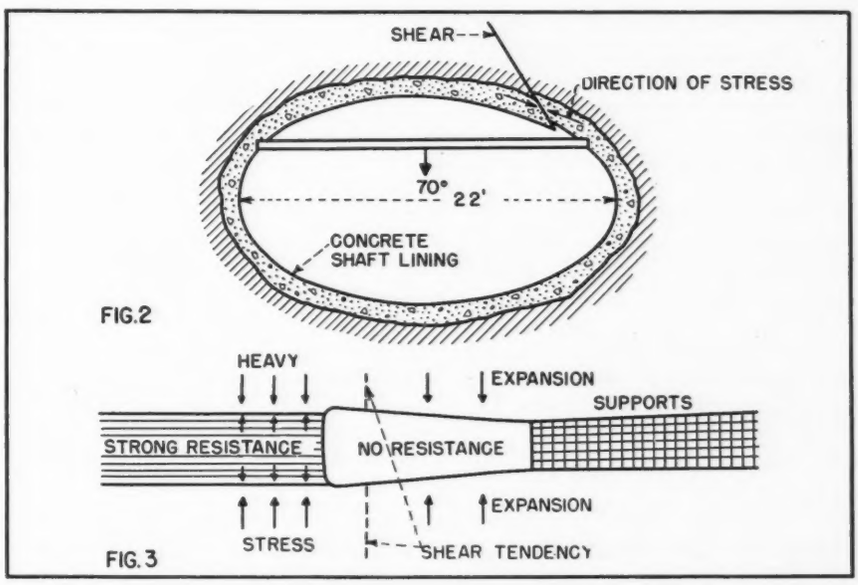


FIG. 2 SHOWS FAILURE in shear of concrete lining of incline shaft at 8,000 ft. depth. Fig. 3 shows mine opening subjected to differential stresses.

Observations on Rock Bursts

The following notes on rock pressure were inspired by R. G. K. Morrison's series of articles on "A General Theory of Rock Bursts," E.&M.J., Dec. 1947, Jan., 1948, and March, 1948.

JACK SPALDING,
A.R.S.M., B.Sc., M.I.M.M.

ALL ROCK BELOW THE SURFACE of the ground is under stress, but this stress is not the simple pressure due to the weight of overlying rock envisaged by many mining men. Except perhaps in the rare cases of a rock mass intersected by open fissures or of a mountain peak, the stress in the rock below the surface is three-dimensional. It may not be actually hydrostatic in character, that is, equal in all directions, but there are horizontal components of pressure that are of considerable magnitude. In ancient rocks which have been quiescent for a long geological period, stresses approach the hydrostatic, owing to the slow regrowth of crystals which takes place under unequal stresses. This regrowth tends to equalize stress components and proceeds at pressures below that which causes plastic flow.

Apart from this, rock masses of comparatively recent formation will have horizontal components of stress at least equal to the hydrostatic pressure of the liquid in fissures through them. This will cause horizontal stresses of not less than one-third the vertical pressure due to the weight.

Where there have been recent geological movements, extra and unpredictable horizontal stresses are to be expected ,but those due to more ancient movements will have been dissipated by crystal metamorphosis tending again to reduce the stresses to a hydrostatic character.

In ancient rocks, such as those of Ontario and Mysore, it is to be

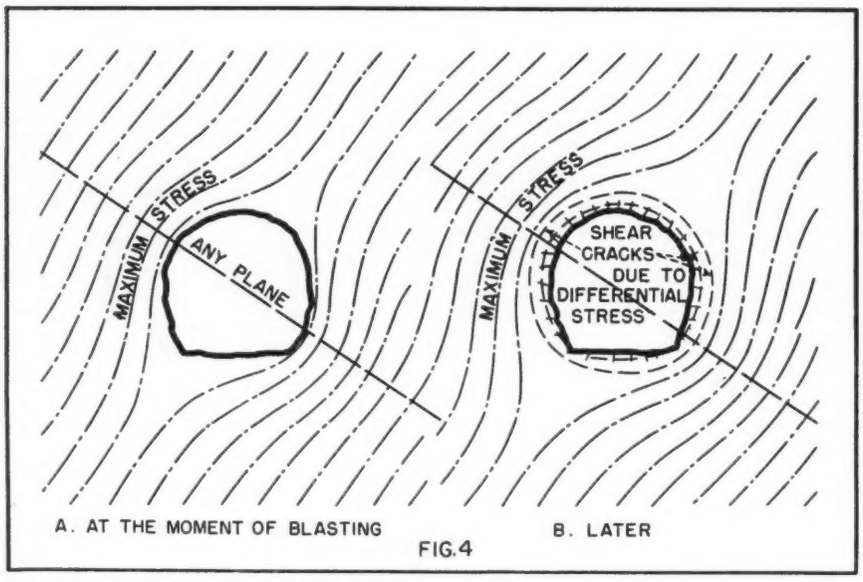


FIG.4

HYDROSTATIC STRESS field is pictured here in the form of force lines normal to any plane through an opening to show concentration of stress in "skin" of mine opening.

expected therefore that the horizontal components of stress will approximate the vertical one: in newer undisturbed rocks they will be smaller than the vertical, but not less than one-third of it: while in recently disturbed ground they may be greater than the vertical. The stress at any point in depth may therefore best be envisaged as one of hydrostatic character, superimposed on which there may be an additional vertical or horizontal stress. It is on the hydrostatic part of the total stress that the following arguments are based; the extra effect of any additional unidirectional stress there may be, will then be comparatively easy to assess.

Violence of Rock Bursts

Being an elastic medium (as are all substances) the rock at depth, subjected to stresses of a hydrostatic character, is compressed by them, and its volume is thus less than it would be at atmospheric pressure. (Sano, for example, experimenting in Tokyo University, found that a granite cube under a stress equivalent to 6,500-ft. depth was compressed by 1% of its dimension.) Rock under stress therefore contains energy, part of which will be immediately given out if the stress is relieved and the rock is allowed a chance to expand. All mining excavations afford the rock in their vicinity this chance. Owing to the comparatively small size and various shapes of the excavations, however, the resulting opportunity to expand is limited, as a result of which most unequal stresses are set up, those in one direction being reduced while those in others are at the same point increased. Under these unequal stresses the rock may fail; how?—whether violently, or slowly and gradually, is merely a matter of the physical character of the rock, or of its constituents at the point in question.

When such a failure occurs, rock is thrown out, the effective excavation is enlarged, and more rock is given the opportunity to expand. Should the failure be a sudden one, the violence of the resulting rock burst will depend on the amount of energy released by the expanding rock. This energy will depend on the stress in the rock and on the mass of rock affected. The former factor is, in most cases, uncontrollable; but the mass of rock which will be affected by a failure can be limited by the technique of mining. In order to explain this it is necessary to consider the way in which closure of stope walls occurs.

When a stope is opened up and extended, the foot and hanging walls are given full chance to expand and relieve themselves of stress normal to the lode plane. This they do, closing in towards one another. At the ends of ground round the area the walls are held apart by the ore in situ, closure is prevented, and acute bending and shearing stresses are caused. Suppose first that no shearing takes place and that closure over the stoped area takes place by bending of the wall rock only. The resistance of the rock to bending will limit the amount of closure (disregarding for the moment the action of supports). In each wall over the stone there will then be a dome of rock which has expanded inwards towards the opposite wall. Suppose secondly that the rock of one of the walls suddenly shears all round the end of ground. The whole of that wall over the stope is then completely free to expand further until it is brought up by the other wall. The action will extend back into the wall decreasing as the distance for the stope increases, forming an "expansion dome," outside which will be the normal dome of increased stress (Fig. 1). The mass of the rock in the final expansion dome will be a measure of the violence of the rock burst.

Supports Reduce Violence

Now suppose that supports had been inserted in the stope as the ground was excavated, and that closure was early arrested by them. Then, if a similar rock burst occurred, provided that the supports withstood the shock, little further closure would take place over the main area of the stope; only the ground around the periphery, where supports had not yet been put in or had not yet come under squeeze, having the chance to expand. In this case the expansion and stress domes would be much flatter and the mass of wall rock affected by the burst would be comparatively small, being mainly confined to a strip round the stoped area between the ground and the supports. Thus the violence of a rock burst is reduced by the presence of supports. For the minimization of damage due to rock bursts, therefore, supports should be such that they will permit as little closure as possible. They must also be such that they will not themselves burst or fail under sudden shock, which failure would, of course, permit further closure.

Rock under compressive stress fails by some sort of shearing action. The normal method of failure under compression is by the occurrence of one or a number of shear planes running at roughly 45 deg. to the direction of stress. In some cases such is the number of these intersecting planes that the material is reduced to powder. (This is the normal phenomenon of crushing.)

Morrison showed how development excavations were ringed around by an envelope of rock under increased tangential stress.

When such an excavation is given a rigid lining of suitable shape, "arching" or easing of the rock round it throws the lining itself into annular compression.

The author saw this well demonstrated in an incline shaft in India at 8,000 ft. depth. The shaft has an elliptical lining of concrete, unreinforced and 18 inches thick. One day, when inspecting shaft, he found that the lining had sheared for over 100 ft. down the shaft, as shown in Fig. 2. The overthrust was about 6 in. Whether the movement took place gradually or with a 'bump' during the previous night was not known, but telltales put in the crack showed no further movement over a period of years. The lining failed under compressive stress by a single shear crack at 45 deg. to the direction of that stress. Unlined tunnels in solid rock, when subjected to excessive stress, fail in a similar manner. If the failure is a quiet, gradual one, the shear crack or cracks may be plainly visible; but should it occur violently, the shock, and the sudden relief from ring stress of the whole of the periphery rock, will cause that rock to be disrupted and its debris flung into the excavation.

Rock also fails by shear when the stress is differential. At the stope face, for instance, the zone (or dome) of heavy stress which embraces the stoped area passes through the ore ahead of the face, with its maximum concentration at that point. Just behind the face, where the walls are bent in under the closure, the transverse stress is largely relieved. Between these two points the ground is subject to heavy shearing stress (Fig. 3). Shear may not occur all round the stoped area as postulated above, but only along one (usually the working) face. This will permit the wall in which the shear occurs to spring in as a cantilever which is held between the supports and the expanding rock which squeezes them. The live load thrown on to those supports by such a failure can easily be imagined.

Stresses Near Excavations

As Morrison showed (E&MJ, Dec.1947), surrounding a cylindrical excavation with an ideally smooth periphery there are in theory tangenitial or ring stresses equal to double the original stress in the ground. The operator knows, however, that in the irregularly-shaped, cracked-up "skin rock" of his drift or shaft there can be little, if any, ring stress at all. How can the opposing claims of theory and practice be reconciled?

What occurs is probably this: As an end is driven, at the moment of blasting, the skin rock of the newly-formed end is stressed (as in theory) to double the pre-existing stress. Having an irregular surface, being of unsuitable shape to contain such stress, and being damaged by the blasting, the skin rock immediately fails; possibly by plastic flow at corners where stresses are concentrated, possibly by the occurrence of minute shear cracks, probably by both. The stress thus evaded by the skin rock is not lost, however, but is taken up by the solid rock further away.

This can be demonstrated by considering any single direction of the hydrostatic stress, and by representing it by lines of force as in a magnetic-field diagram. In Fig. 4. the stress field normal to any plane through the axis of a drift is shown, the concentration of the force lines at the skin of the drift indicating (at A) the doubled stress at that point. After arching and easing of the ground, the skin relieves itself of stress and the concentration moves further back into the rock (B). It will be noted that, as a result of this, the effect of the drift on the stress distribution persists to a greater distance. Since the diagram depicts forces normal to any plane through the axis, it must be typical of every plane, so that the increased stresses indicated as crossing the plane actually persist all round the periphery .

Stress in Pillars

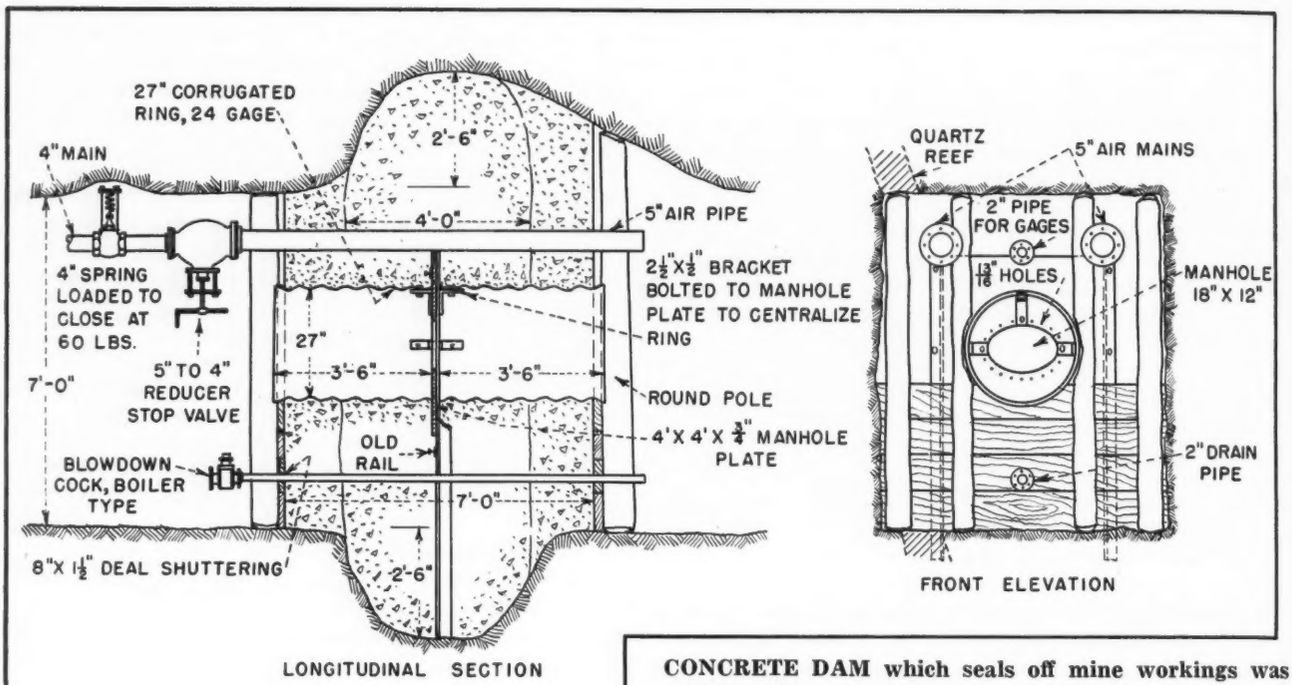
Morrison stated that "Development points through ground so stressed"—he was referring to pillars—"are subject to a very high rock burst risk. Why this is so is not clear." The reason is in fact due to the stress, normal to the lode plane, in a pillar being much higher than the original stress in the ground—it may double the latter or even more. Let the original pressure in the rock be Q, and in a pillar suppose it is 2Q. What then is the maximum stress in the periphery of a development end through that pillar? It will be double the normal stress in the ground, which in the pillar is not Q but 2Q. Therefore, the maximum ring stress in the periphery of the drift will be not 2Q but 4Q or double that round drift which is distant from other workings. The liability of that drift bursting can therefore be readily understood. This liability is increased by the fact that though the stress normal to the lode is thus so greatly augmented, that in the lode plane (with free faces all round) is probably somewhat less than normal. The pillar is, in fact, not subjected to stress of a hydrostatic nature at all, but simply to excessive stress in the direction normal to the lode plane. The result is that the pillar is tending to fail under compression, which failure, when it occurs, will take place by the formation of a number of shear planes at 45 deg. to the lode plane. The presence of this incipient shear in the rock round a drift through the pillar is an additional incentive to that rock to fail.

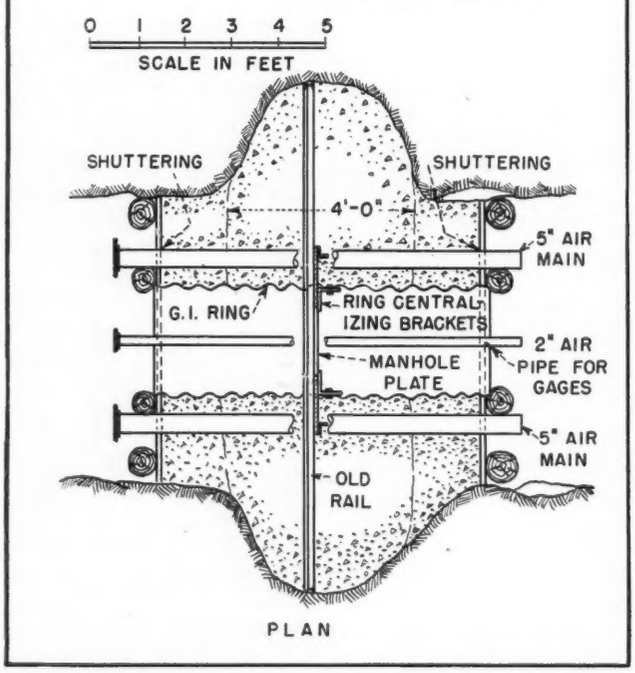
Why Rock Bursts

In one mine rock bursts are common, while in another where conditions are apparently the same they are unknown. This has been often 'explained' by postulating abnormal stresses in the ground of the unfortunate mine, due to geological causes. It should be remembered, however that the failure or not of a rock under stress does not depend solely on the magnitude of that stress but on the crushing or shearing strength of the rock. Again, the strength of a rock is not necessarily a measure of its liability to burst; other factors also affect the issue, such, for instance, as the composition of the rock.

It is suggested that those rocks which consist largely of a single ingredient, such as quartz or hornblende, are more likely to burst than others, such as granite, which are an agglomeration of grains of substances with widely differing qualities. If a granite is subjected to a continually increasing stress, the weakest ingredient will eventually be strained beyond the elastic limit. The grains of this ingredient, slowly yielding by plastic flow, will then throw additional stress on the surrounding grains, until these also become plastic under the gradually increasing load. Thus eventually quiet progressive failure of the whole occurs. Given similar conditions in (say) a quartzite, the stress will rise until, at some moment, the whole mass reaches the elastic limit. Failure is then more likely to occur suddenly, depending even then, however, on the physical characteristics of the material.

Editor's Note. This theory of the author is merely tentative, and it would be interesting to hear from other operators whether it is borne out in practice.





AIR VALVE SHOWN above is opened during drilling periods of mining cycle. Note effect shown on charts in Figs. 2 and 3.

CONCRETE DAM which seals off mine workings was poured after enlarged area in drift had been cleaned.

Mine Workings To Serve As

CHARLES PENGILLY

Mine Manager, Tebekwe Mine
Homestake Gold Mining Co., Ltd.
Selukwe, Southern Rhodesia

WHEN AIR COMPRESSOR CAPACITY proved inadequate to meet demands of an expanding development program of the Tebekwe mine of the Homestake Mining Co., Ltd., at Selukwe, South Rhodesia, a large-capacity underground receiver was constructed to remedy the situation. As shown in the accompanying drawings, a stout concrete dam was constructed to seal off a drift and connected crosscuts totaling 1,150 ft. in length and 46,000 cu.ft. in capacity.

Advantages of Receiver

Benefits of this installation were as follows: Formerly three air compressors with 365-cu.ft., 226-cu.ft., and 229-cu.ft. capacities, respectively, were required to deliver a steady supply of air for mine equipment at 70-lb. pressure. After the receiver was completed, the 299-cu.ft. compressor was shut down, and the remaining two mantained a steady pressure. Instead of three compressors cutting in and out at varying pressures, the mine operated with two compressors on a steady load. This caused an appreciable saving in kva. demand charges. Note Fig. 1 which shows constantly changing pressures with two and three compressors operating without the underground receiver. Then note Fig. 2 which shows steady load on two compressors delivering air to the underground receiver during a similar working cycle. In both instances air was supplied to air drills and a drill sharpening shop.

The above charts were recorded for pressures taken at the surface near the compressors. Now note Fig. 3 which was recorded at the underground receiver indicating the steady pressure at which air was delivered to underground equipment, during drilling periods when the valve at the receiver was opened.

The underground air receiver enabled the mine to add three, or possibly four, more machines per shift if needed without installing a large compressor. On one occasion, due to a power failure, the compressors were shut down for 25 min., but seven machines continued running. Although pressure fell 5 lb. the two compressors, on being restarted, were able by the end

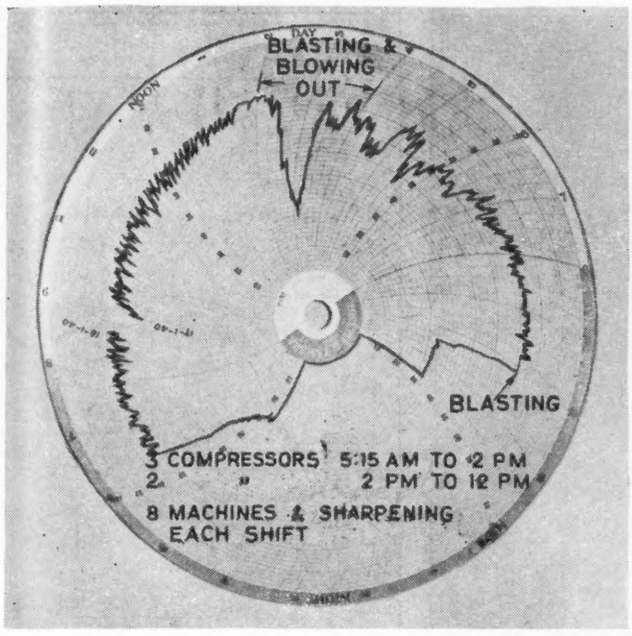


FIG. 1. Chart at compressor room showing variation in pressure before underground air receiver was connected.

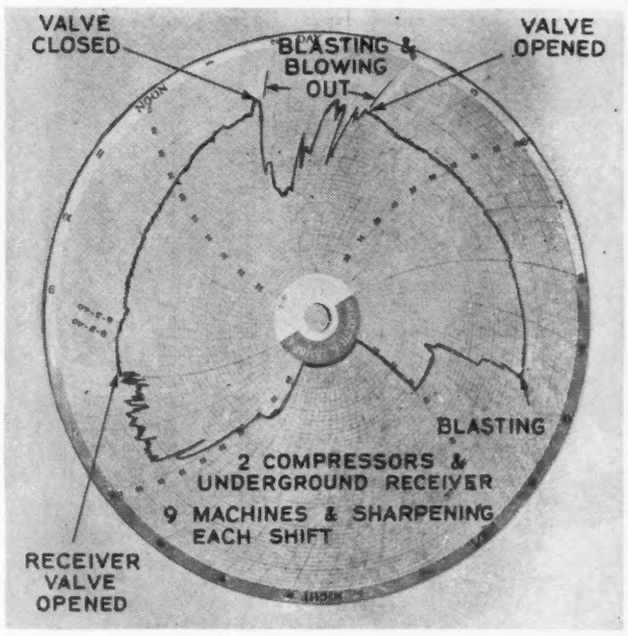


FIG. 2. Chart at compressor room, after underground receiver was connected. Note steady compressor load.

Are Sealed Off Air Receiver

of the shift to bring pressure back to the same as existed before the power failed.

Construction of Dam

Construction details of the concrete dam sealing off the receiver are shown. Wall rock adjacent to the quartz reef is a fine-grained granite traversed by fissures in various directions. Therefore the area enlarged for the dam site was carefully cleaned and washed down. Wooden forms (shuttering) were erected with pipes, manhole, and corrugated passageway set in place as shown. A small concrete mixer powered by a 5-hp. electric motor supplied the 3:2:1 mixture to fill the forms. Forms were removed one week after pouring.

After a period of six weeks, three air compressors delivering a total of 890 c.f.m. at 80-lb. pressure were used to charge the receiver to 80 lb. Several leaks developed. Consequently the receiver was discharged, and grouting equipment (See E.&M.J., April 1948) was used to seal up leaks around the dam, and fissures in the floor, walls, and back on both sides of the dam.

Then the receiver was successfully recharged using the three compressors mentioned above. After running 5½ hr. the receiver pressure was 77 lb. per sq. in. A few small leaks developed through minute fissures, but these were stopped without discharging the receiver by drilling a number of holes and grouting the leaky areas with cement at 470 lb. pressure.

When charged to 77 lb., the rate of pressure drop due to losses is 2 lb. per sq. in. per 24 hrs., representing less than 10 cu.ft. of free air per min. Approximately 61,000 cu.ft. of free air at between 60 and 77 lb.

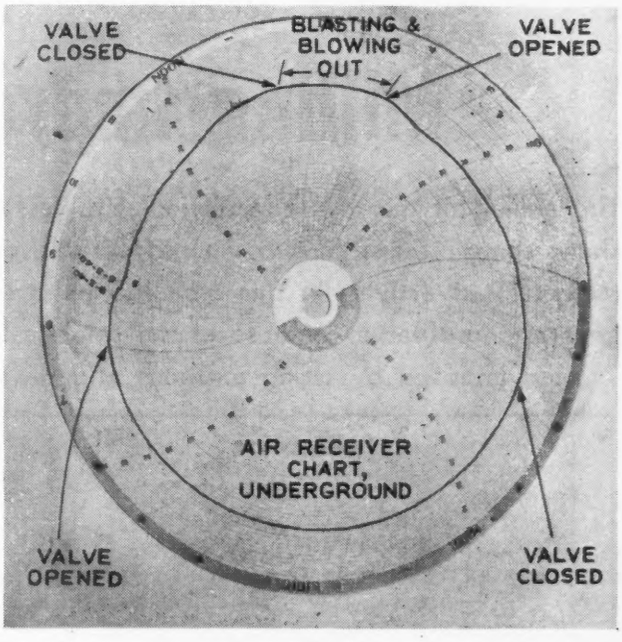
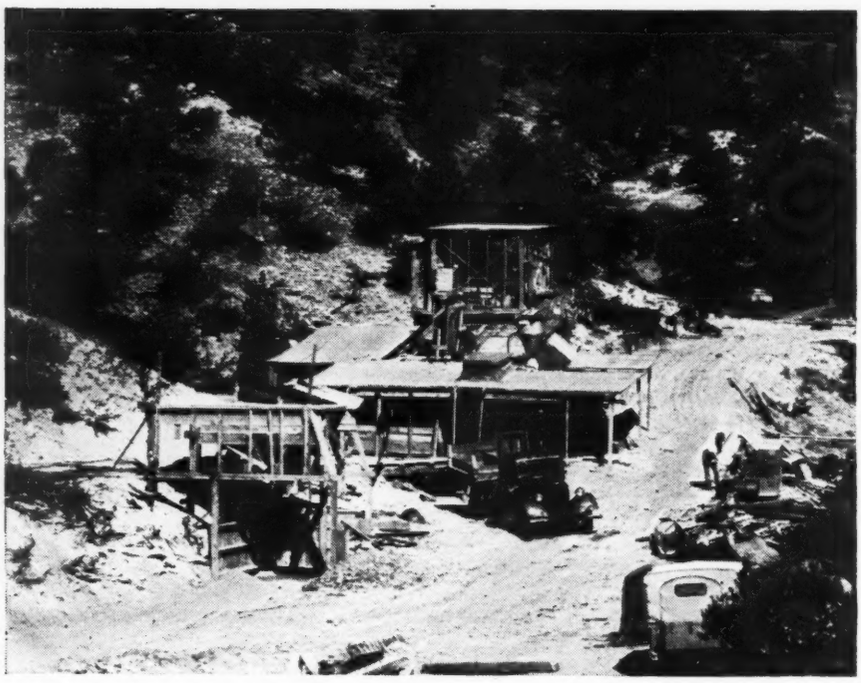


FIG. 3. Chart at underground receiver showing steady pressure of air delivered to machines. Period for Fig. 3 is same as for Fig. 2.

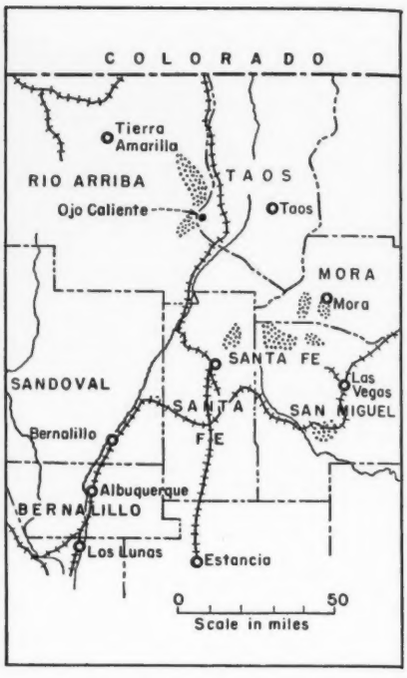
gage pressure can be supplied by the receiver without the compressors running. This would keep about ten machines running for one hour.

Cost of the receiver totaled £333 15s. 8d. at the time of installation. It was suggested that large air mains might have been installed. However, cost of piping affording equivalent capacity of the receiver was estimated to total £62,887. Labor costs would have to be added.

The facts here presented were abstracted from a paper prepared for the Institution of Mining and Metallurgy (Vol. 2, pp. 367-383 incl.) in response to numerous requests received by Mr. Pengilly for information on the construction and operation of the underground receiver.



EXPERIMENTAL MILL of the Southwestern Mining and Milling Co. near Ojo Caliente.



MICA AREAS in northern New Mexico.

Milling Improves Northern New

The milling of mica, in conjunction with less selective mining, shows some promise of reviving production from northern New Mexico. Past activity in this area has been spasmodic and in general unprofitable, because of the small-scale, selective mining imposed by crude methods and distant markets.

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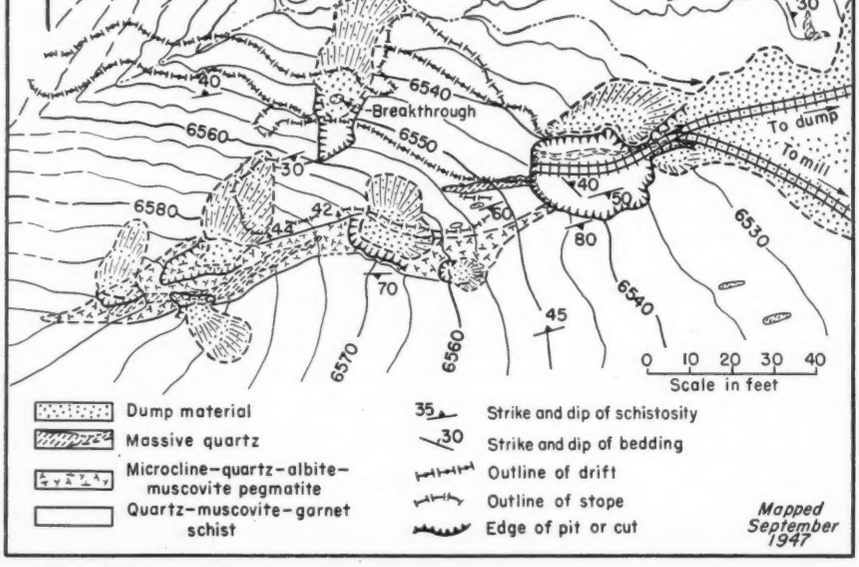
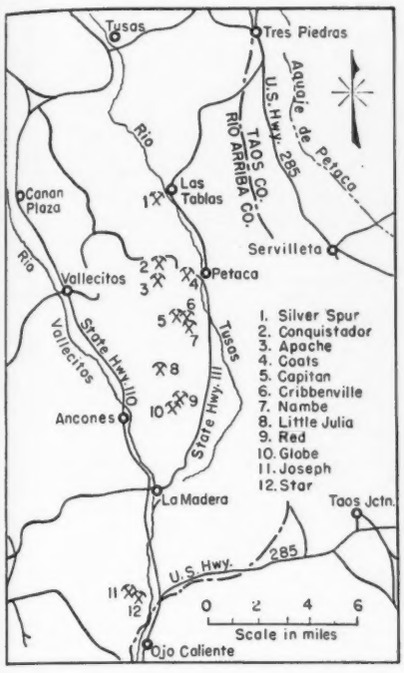


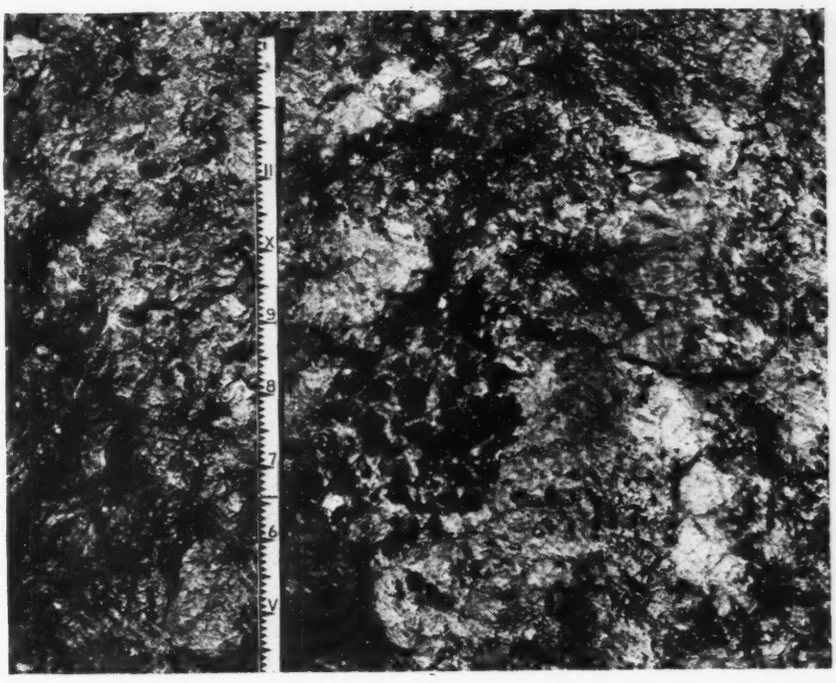
SOUTHWESTERN MINING AND MILLING CO. property near Ojo Caliente, Rio Arriba County.

MUSCOVITE HAS BEEN OBTAINED commercially from pegmatite deposits in northern New Mexico for more than 300 years, although production has been spasmodic during considerable parts of this period. The earliest operations were aimed at recovery of large, reasonably flat crystals, or books, which were split and trimmed into window panes for buildings in Santa Fe and other nearby settlements. The smaller books and whatever warped, broken, or otherwise imperfect mica that was encountered were discarded at the mines.

The early mining was highly selective, and led to development of small open cuts and tortuous "gopher hole" workings that closely reflected the distribution of the richest mica concentrations. By far the largest production from operations of this type was obtained from the old Cribbenville deposits, (2.6,) approximately two miles southwest of Petaca in Rio Arriba County,



LOCATIONS of mica mines discussed.



EXPOSURE OF PEGMATITE rich in coarse muscovite (dark masses), Joseph quarry.

Mexico Scrap Mica Outlook

and most of the remainder was obtained from several deposits in the mountainous area between Santa Fe and Mora.

More systematic mining, based upon demands for mica of the type used for stove windows, began about 1870. Operations were gradually expanded beyond the Cribbenville area, especially after the turn of the century, and by 1912 numerous occurrences had been prospected or further developed in eastern Rio Arriba County, northeastern Santa Fe County, and in western San Miguel County. Nearly all the output was transported first by mule back and later by wagon to Pueblo, Colorado, when it was shipped to eastern markets. Under such conditions only the largest mica books containing sheet material were sought, as shipping costs were very high.

Later, when branches of the Atcheson, Topeka, and Santa Fe Railway and the narrow-gauge Alamosa-Santa Fe line of the Denver and Rio Grande Railroad were in operation, it became possible to haul by wagon to shipping points much nearer the mines. This was accompanied by a distinct change in the type of mica that was marketed. Whereas the earliest production of scrap mica from northern New Mexico was a minor byproduct from the preparation of stove material in Pueblo, Chicago, and other processing centers, the ratio of shop, or bench, scrap to total production gradually rose as transportation costs were lessened. Mica of smaller size and poorer quality was handled, and even some scrap material was shipped from the mines as such.

Later Activities

Although the use of stove mica began to decline prior to World War I, the effects of this dwindling demand were more than compensated by increasing interest in electrical uses. In response to rises in price schedules, mica mining in New Mexico was especially vigorous during the periods 1913-1919 and 1923-1930, when a few moderately large mines accounted for a substantial part of the increased production. Owing to the widespread policy of shipping roughly selected "mine-run" mica out of the State for processing, the proportion of scrap mica in the total output remained low so long as no independent effort was made to recover the poorer quality material left at the mines.

Some efforts were made to start a scrap mica industry in the Petaca and Ojo Caliente districts during the decade following World War I, and a dry grinding plant was operated in Las Tablas. The ratio of pounds of sheet mica to tons of scrap produced from New Mexico deposits was decreased by these activities to about 25:1 from a previous figure of nearly 40:1. The long rail haul to points of demand remained a serious cost factor, however, and only the richest deposits were found to be capable of sustaining mining operations.

During the decade 1930-1940 scrap mica was obtained from three large mines and from numerous smaller properties. The Joseph mine, about 1½ miles north of Ojo Caliente, yielded several thousand tons of scrap before it was shut down in 1932. A punching and dry-grinding plant was operated for a few years at the Apache mine, 2½ miles west of Petaca, but work there was suspended in 1939. The Globe mine, 4½ miles north of La Madera, was developed primarily as a source of scrap mica from 1936 to 1946, and in addition became the State's leading producer of sheet and punch material during World War II.

Production of scrap mica from New Mexico deposits during the

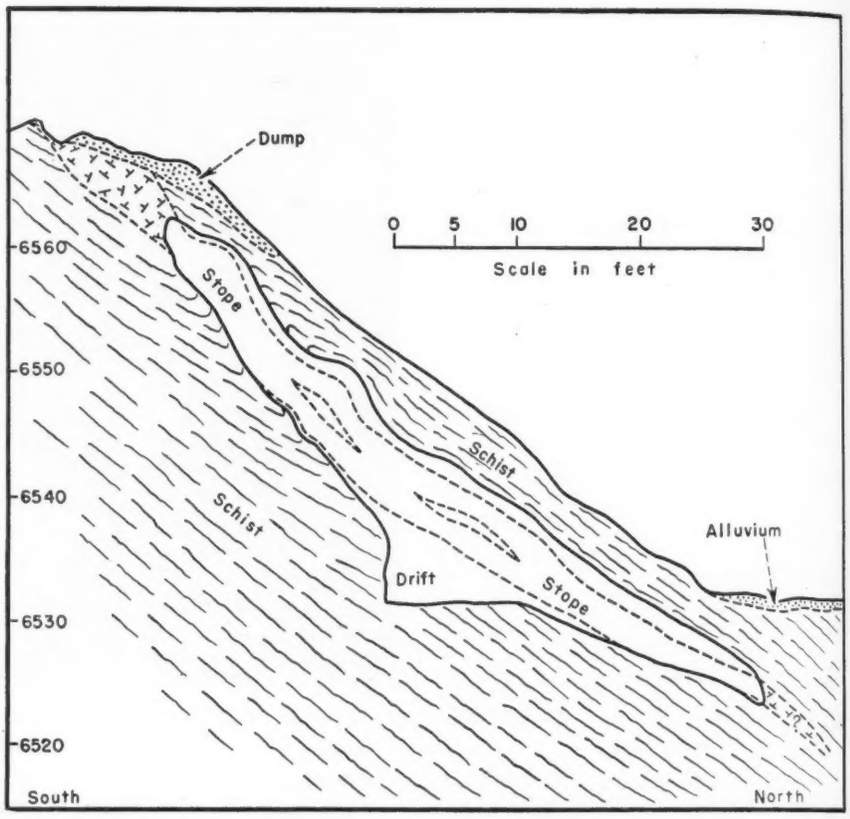
period 1900-1942 probably has amounted to as much as 35,000 tons, more than half of which was derived from deposits in the Petaca district. The average value of the entire output was about $16 per ton. Although these figures are approximations, owing to incomplete records of production from individual mines, they probably are of the correct order of magnitude. Mines that have been leading sources of scrap mica include the Apache, Capitan, Coats, Conquistador, Cribbenville, Globe, Nambe, Red, and Silver Spur in the Petaca district, and the Joseph and Star in the Ojo Caliente district.

Geologic Features

The mica-bearing pegmatites of northern New Mexico occur as dikes, sills, pods, pipes, or more irregular masses, chiefly in granite, metarhyolite, diabase, amphibole schist, and metasedimentary rocks. Both the pegmatites and the country rocks are pre-Cambrian in age. Many of the mica deposits have been described by Holmes (1), Sterrett (3), Talmadge and Wootton (4), Just (5), Jahns (6), and Wright (7). In general they contain abundant quartz, potash feldspar, sodic plagioclase, and muscovite, with accessory beryl, columbium-tantalum minerals, fluorite, garnet, monazite and sulphide minerals. Other species are known, but they are rare.

In those deposits that have been mined, book muscovite is associated with abundant fine to coarse-grained albite. The books characteristically occur in well defined shoots that are consistently oriented with respect to the structure of the containing pegmatite body, or with respect to fractures within the body (6). The mica in a few large pegmatites of the Ojo Caliente and Mora areas is present in elongate to irregular shoots or streaks that bear no consistent relation to the structure of the containing pegmatite body, but such occurrences are exceptional.

The proportion of book muscovite in the shoots that have been mined ranges between wide limits. Most of the better deposits in the Petaca district contain 9 to 12 per cent of mica (6), and the two or three best deposits in the Ojo Caliente district are somewhat richer. In contrast, only a few deposits in the Sangre de Cristo areas to the southeast are known to contain more than 8 per cent of mica. The average proportion of trimmed punch and sheet mica that can be recovered from the mined books in New Mexico probably is 0.5 per cent or even less, and hence is considerably lower than the average recovery in most other districts of the United States. With their relatively high overall mica content and their relatively low content of the higher grades of mica, the New Mexico deposits probably offer greatest promise as sources of scrap mica.



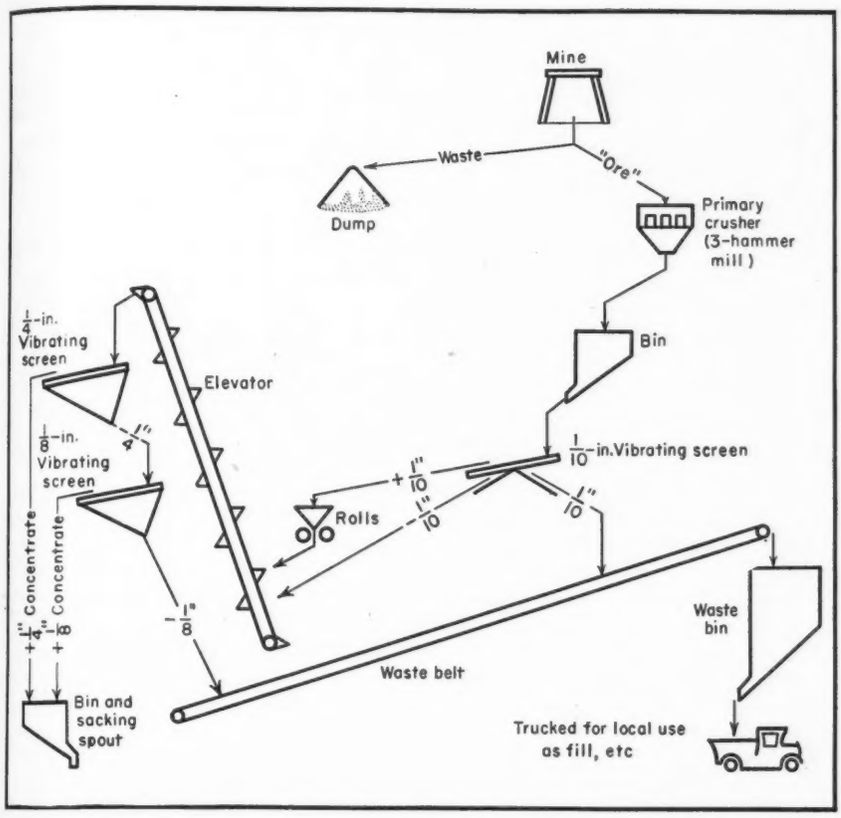
SECTION through main stope, mine of Southern Mining and Milling Co. Two mined-out core segments of massive quartz are shown in central part.

The coarse muscovite in New Mexico pegmatites ranges in color from pale yellowish green through yellowish olive to pale and deep brownish olive. It occurs in books two to three inches in average diameter, although dimensions of several feet are by no means uncommon. Many of the books are irregularly intergrown, or "tangled," and some aggregates of such books are three feet or more in maximum dimension. The chief imperfections are "A" structure, wedge structure, ruling, warping, and cracks. A few deposits in each of the pegmatite districts contain mineral-stained mica, but such staining rarely is dense. Owing to its prevailingly light color and freedom from dense iron oxide stains, New Mexico mica ordinarily yields a very white product when ground. For this reason it commonly commands a premium price, and much of it is used for blending with darker colored varieties obtained from other areas.

Attempts are now being made to recover scrap material at the Apache, Little Julia, and other properties in the Petaca district. These involve small-scale mining operations and the screening of old backfill and dump material. Production to date has not been large. The Globe mine, a rather large underground operation that has yielded more than 5,000 tons of scrap mica, was closed down during the winter of 1946-1947, and much of the equipment was removed.

Milling Introduced

An unusual method of mica production is being tested in the Ojo Caliente district by the Southwestern Mining and Milling Co. of Albuquerque, New Mexico. A thin, lenticular pegmatite body is mined from wall to wall by underground methods, and its mica-rich parts are milled on the property. This operation differs from much previous work done on mica-bearing pegmatites in the Western states, in that it is aimed solely at the recovery of scrap material. It also is in marked contrast to past practices in the Ojo



ONE FLOWSHEET OF SOUTHWESTERN MINING AND MILLING CO. mill showing treatment with hammer mill, screen, rolls, and screens.

Caliente district, as a large proportion of the pegmatite body as a whole is treated. During previous years, in contrast, considerable quantities of scrap mica were obtained from the nearby Joseph pegmatite by highly selective surface and underground mining. The mica was hand sorted from numerous rich concentrations in a very large and coarse-grained pegmatite.

The mine of the Southwestern Mining and Milling Co. lies near the bottom of a shallow gulch about a mile west of the Rio Vallecitos and two miles north of Ojo Caliente. Development is in a sill-like pegmatite body about 160 ft. in outcrop length and three feet in average thickness. This and other segments of what appears to be a long, lenticular mass of mica-bearing pegmatite crop out along the crest of an easterly trending ridge, and dip moderately to steeply northward in strongly foliated quartz-muscovite-garnet schist. The entire mass is at least 550 ft. long, and in general it thickens westward from a knife edge to a maximum of 12 ft. near its end.

The mine was opened in August 1946, when an old, slumped cut near the east end of the deposit was cleaned out. This excavation is 40 ft. long and 10 to 25 ft. wide, and along the north edge of its floor is exposed the tapering "tail" of the pegmatite sill. An old drift that extended west-northwest from the cut was enlarged, and both underhand and overhand stoping were begun. In September 1947 the workings comprised the main cut, several smaller open cuts, a 130-ft. drift, and three moderately dipping stopes. Two of the stopes are connected with the surface by means of a short entry driven from the hillside to the north. The pegmatite thickens westward in the mine from less than a foot in the main cut to 4½ ft. in the drift, and tapers downward from the outcrop to the bottom of the underhand stope.

The bulk of the pegmatite itself is a coarse aggregate of white to pinkish buff microcline, white to brick red albite, quartz, and muscovite, with scattered irregular masses of garnet and rare crystals of beryl, columbite, and fluorite.

The mica is hard and fairly flat, but most of the books are small. A few are as much as eight inches in diameter, but the average size of cleavage pieces is 1½ by 2½ inches. The chief defects are ruling, cracks, and scattered specks, spots, and thin trigonal lattices of iron oxides. A little punch mica might be recovered by carefully selecting the best books for shop processing, but it is doubtful whether the increased value of the output would balance the attendant increases in costs of preparation.

Another lenticular, sill-like body of mica-bearing pegmatite is exposed in a small open cut 150 ft. north-northwest of the mine portal. A very thin zone of medium-grained muscovite - microcline-albite-quartz pegmatite encloses a pod-like core of massive quartz. The maximum combined thickness of these units is about eight feet. Similar quartz-rich pegmatites and several quartz veins are exposed to the north.

In mining, the rock is broken and either chuted or shoveled into cars. Some carloads of pegmatite are discarded on the dump, but such material represents only a small proportion of the whole. The bulk of the broken rock is processed in an experimental mill that has an estimated output capacity of about five tons of rough concentrate per day. The milling process, as of September 1947, included crushing in a hammer mill, elimination of fines through a 1/10-inch vibrating screen, secondary crushing through rolls, and recovery of a final product on 1/4-inch and 1/8-inch vibrating screens. Many of the small mica flakes adhere to one another during handling, so that final recovery is increased by adding some of the minus-1/10-inch material to the feed for the 1/4-inch and 1/8-inch screens.

Several Combinations

This represents only one of several equipment combinations that have been tried, and other changes have been made since the writer's last visit. It was found, for example, that the rolls were not wholly satisfactory for the secondary crushing. They were repeatedly forced apart by thick mica books, during the passage of which much coarse quartz and feldspar was admitted to the final screen feed. A rather impure concentrate thus was obtained. Air separation was once tried as a means for obtaining clean concentrates, but was abandoned in favor of the simpler crushing and screening.

The average mica content of the mill feed varies from time to time, with a general range of 10 to more than 30 percent, and a probable average of about 15 per cent. More than two-thirds of the mica in the mined pegmatite is said to have been recovered during the period when the flowsheet shown was used.

During the first year of mining, total output from the property was small, owing chiefly to an emphasis on experimentation rather than production, at least so far as the milling procedure was concerned. About 30 tons of mica is said to have been prepared in a small dry-grinding unit that was operated for only a few weeks, but larger quantities of coarse mill concentrate have been shipped as such to Los Angeles and Chicago concerns for grinding. According to Mr. Earl Eichelberger, president of the Southwestern Mining and Milling Co., the organization has bought several other properties in the Ojo Caliente and Petaca districts, and expects to erect two or three additional small mills as soon as a wholly satisfactory flow-sheet can be developed for the present plant.

Future Possibilities

The mica-rich dumps at several New Mexico mines have attracted the attention of visitors for many years. This mica was discarded in searching for coarser material of higher quality, and in most instances represents a substantial proportion of the mica that was removed from the pegmatite. Additional quantities of mica are distributed through the backfill in some mine workings, and constitute another potential source of scrap material. Finally, numerous pegmatites contain much mica that remains in place, even where the richest parts of the shoots have been mined out. The average mica content of the best New Mexico pegmatites is fairly high, and the region as a whole represents a potential source of moderately large quantities of scrap material.

The great distance of the deposits from markets has been a serious disadvantage to mine operators, as transportation costs generally have greatly reduced or even eliminated their margin of profit. The effect of such costs was particularly well shown in 1932, when the La Madera branch of the Denver and Rio Grande Western Railroad was abandoned. Most of the scrap mica mined in the Ojo Caliente district had been shipped over this line. The large-scale operations at the Joseph mine were soon abandoned, as the increased costs of trucking the mica to the next nearest rail shipping points were found to be greater than the previous margin of profit. However, an active program of road improvement has been extended to several of the mining areas during recent years, and it is hoped that truck transportation of scrap mica to such rail points as Santa Fe, N. M., and Alamosa, Colo., will be considerably improved thereby.

The light color and generally good quality of New Mexico mica have enabled it to compete with scrap material from more favorably located deposits nearer to centers of processing and consumption, but only during periods of high prices. Another favorable factor has been low labor costs, which have characterized the region during past periods of vigorous pegmatite mining. Moreover, a substantial part of the past output represents small-scale efforts of many individuals who informally worked various deposits for only a few days or a few weeks at a time. The proportion of total production from operations of this type has decreased markedly during recent years, however, while labor costs for larger-scale operations have increased.

In analyzing past activities and future possibilities for the Petaca and Ojo Caliente districts, Just (5), concludes that improvements in exploration and exploitation are urgently needed. He states that advances in mining must depend on new methods of discovery or modification of the common methods of mining, and adds that if the operator is "seeking improvement along these lines, consideration must be given to the typical pegmatites as a whole rather than to the scattered mica-rich shoots. By mining bulkier and more typical material the advantages of larger-scale and continuous operations could be obtained. If the more abundant components of the mica-bearing pegmatites could be mined without appreciable loss, geological conditions warrant the expectation that new mica-rich shoots would be uncovered, and it seems likely that the returns from these shoots would justify the entire program."

Prospecting Guides

Jahns (6), has commented along similar lines, and points out that guides for prospecting have been established as a result of detailed studies of many deposits in northern New Mexico. Though irregular and discontinuous in detail, the mica shoots tend to be rather consistent in position and orientation with respect to the shape and structure of the enclosing pegmatite bodies. Large parts of many pegmatites therefore can be eliminated from early consideration as sources of commercial mica. He adds that "erection of a mill in or near the district for the separation of scrap mica from material that ordinarily would be discarded on the dump might increase the net value of the mined rock . . . A mill would further encourage the adoption of low-cost bulk methods of mining. A grinding plant might be operated in conjunction with the mill, and the mica shipped to market areas as fully prepared material. Neither a mill nor a grinding plant should be erected, however, in advance of the analysis of all economic factors involved."

The current activities of the Southwestern Mining and Milling Co. represent an interesting development along the lines discussed above. A mica-bearing pegmatite that contains very little sheet material is being mined in bulk, and nearly all of the mined rock is being milled. No large-scale mining has been attempted as yet, nor has a milling procedure been established in detail. The operators, however, are accumulating data that should be of considerable value in the production-scale mining and milling that are planned for the near future. If such plans mature during the present period of favorable prices for scrap mica, the resulting operations should merit very close attention. They might well throw considerable light on the future possibilities for scrap mica production from the entire northern New Mexico region.

ACKNOWLEDGMENT — The writer wishes to thank Joan T. Rounds, who prepared several of the illustrations, and Ian Campbell and D. F. Hewett, who critically examined the manuscript.

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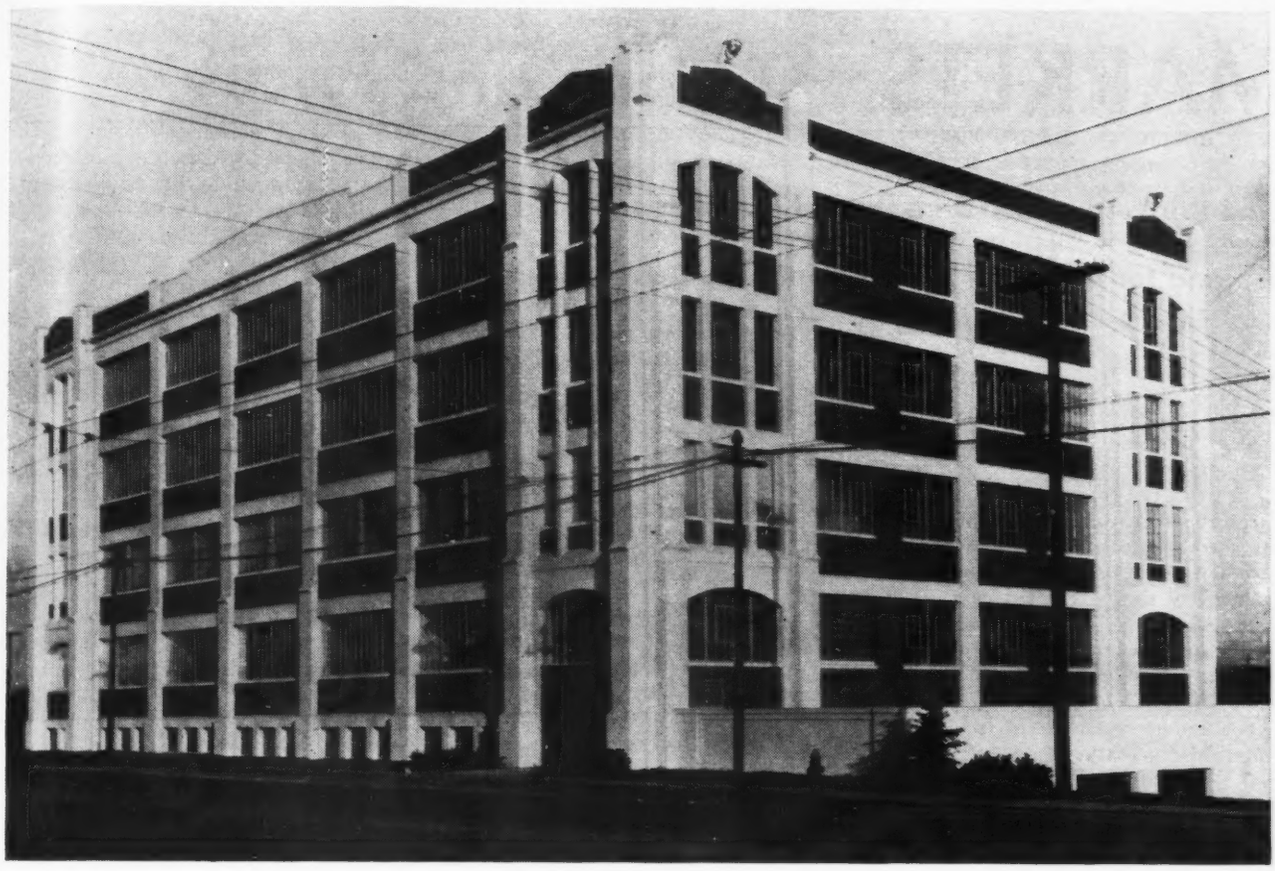
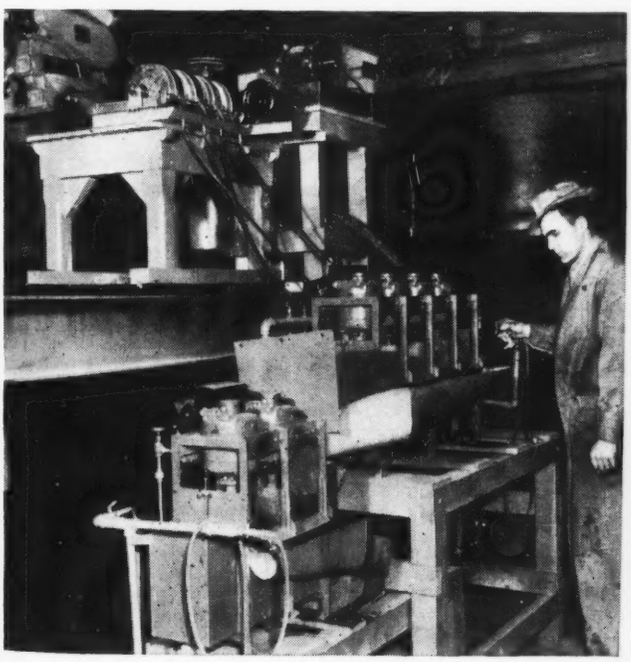
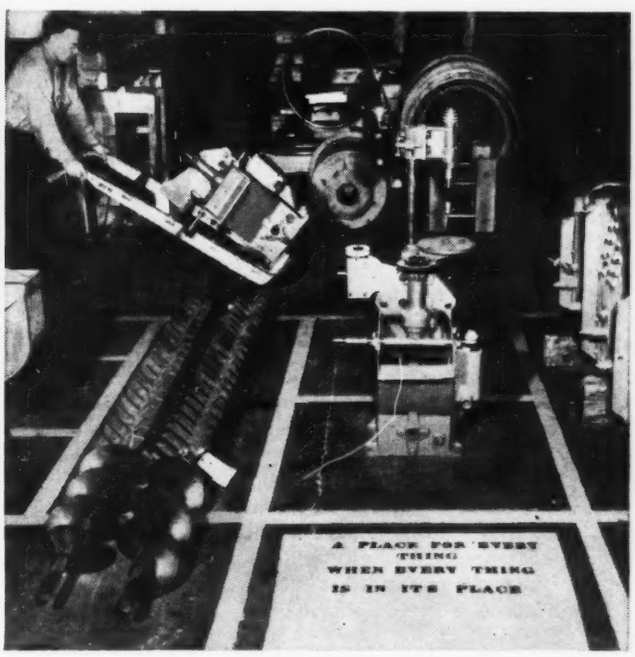


For Long Range Iron Ore Research

THE NEW LABORATORY of Oliver Iron Mining Co., U. S. Steel's Lake Superior ore mining subsidiary, is housed in this substantial building in Duluth. With 58,540 sq.ft. of floor space, it has facilities for batch testing, pilot plant work, chemical analysis, microscopy, petrography and specimen preparation—also a technical library, conference room, sample, and equipment spaces, offices, shower room and garage.



STUDIES to develop commercially useful concentrating methods for taconite, wash ores and intermediate ores, comprise the laboratory's work. Here, pilot flotation is under way.



EQUIPMENT required for laboratory work is stored on floor areas marked off as shown. The sign, "A Place for Everything When Everything Is in Its Place" is a reminder for everyone.

MARKETS — Trends and Prices

Lead Price Advanced Sharply to 17½c. Basis, N. Y.— Demand for All Major Metals Continues Active

APRIL WAS ANOTHER MONTH of high activity in major non-ferrous metals. The preparedness program here, along with aid to European countries, served to stimulate the demand for copper, lead, and zinc. Excepting quicksilver and tungsten ore, the general price structure continued to favor the seller. Outstanding in price developments during the last month was a sharp upward revision in lead, establishing the quotation at the record level of 17½c. per pound, New York. The rise in lead was reflected in the E. & M. J. index of non-ferrous metal prices, which advanced from 155.63 in March to 160.67 in April, a new high. The higher lead market was foreshadowed by pressure from consumers who were paying premium prices for both foreign lead and scrap.

St. Joseph Lead Co., in taking the initiative in raising the quotation, issued the following statement:

"This is the first change in price since March 3, 1947, when the domestic price was raised to meet the world market price in order to assure the necessary imports to meet the extraordinary consumption requirements. It had been hoped that no further increase in the price would be necessary, as an abnormally high lead price will adversely affect the future consumption of the metal. However, during the last six months, the world price has advanced substantially, with the result that United States consumers of lead have been purchasing foreign lead at a delivered price considerably in excess of the domestic market and, in fact, have also purchased domestic secondary lead at premiums. The present price for foreign lead is now between 17c. and 18c. per pound, delivered, New York.

"In addition to refined lead, the United States has been importing substantial tonnages of concentrates. Unless the domestic price is in line with the world market, there is danger that these concentrates will move elsewhere. . . . It is again hoped that a domestic price at the equivalent of the foreign price will assure us of necessary imports, that the increase will act as a further stimulus for producing lead from the mines of our country, and assure the normal flow of scrap through secondary markets."

Demand for lead at the higher price showed no indications of subsiding. Holding to the view that the Government would stockpile any surplus lead that may come into the market during the remainder of 1948 at the prevailing market price, consumers continued to ask for all of the metal that they could obtain from foreign and domestic sources. In some instances consumers began to conserve on the use of lead because of the price situation. Reduced consumption in some applications, together with an expected expansion in output, may ease the tension in the lead market this summer. As the month ended, four mines operating in Mexico remained closed because of labor difficulties, adding to the troubles of the industry.

Following the rise in lead, it became known that Australian producers sold between 20,000 and 25,000 tons of lead in the United States market for shipment over the remainder of the year on the basis of the New York quotation, including the import duty of 1.0625c. per pound. This action was viewed as a significant move that should carry great weight in stabilizing the market. The leading Canadian producer raised its price for the home market to the basis of 16.75c. per pound.

Zinc moved into a strong position and a rise in the price was expected in producing circles. Concentrate producers in the Tri-State district were dejected over the "bogged down" subsidy bill (HR-2455) and felt that the only course now open to them was to raise the price of blende. It will be recalled that when zinc concentrate advanced last January the price of slab zinc followed almost immediately. The market for Prime Western zinc continued at 12c. per pound, East St. Louis, throughout April, but offerings of forward shipment metal on a firm price basis were comparatively light. Both Prime Western and Special High Grade were extremely tight. Production of slab zinc in the United States in March amounted to 73,209 tons, against 66,784 tons in February. The daily rate of production for both months was about the same. Shipments in March came to 76,241 tons, of which 8,298 tons was for export and 3,702 tons was earmarked for Government account.

Copper Needs Large

Consumption of copper in the United States during March amounted to 120,167 tons, which compares with 115,238 tons in February and 127,227 tons in January, according to figures compiled by the industry for the fabricating division. Deliveries to consumers in March totaled 122,988 tons, against 106,823 tons in February and 118,855 tons in January, Copper Institute reports. Deliveries of refined copper outside of the United States amounted to 69,127 tons in March, against 55,133 tons in February and 79,962 tons in January.

The dollar exchange situation eased during April, with the result that foreign buyers who will benefit from the Marshall plan purchased copper more freely. Countries participating in the aid program have indicated that they stand ready to absorb slightly more than 1,000,000 tons of copper in the next 15 months. More active buying of copper abroad, preparedness and stockpiling here, and continued heavy home consumption, are expected to create a firm situation in copper for some time to come.

Refined Lead—1946 and 1947

(Bureau of Mines)

Refined lead available for shipment to consumers during 1946 and 1947, in tons:

	1946	(a)1947
SUPPLY:		
Stocks at primary refineries Jan. 1	37,691	40,963
Government-owned stocks on Jan. 1	66,700	45,493
Production at primary refineries	(b)346,210	(b)486,000
Imports	112,241	159,512
Total available	564,842	731,968
WITHDRAWN:		
Stocks at primary refineries on Dec. 31	40,963	14,026
Government-owned stocks on Dec. 31	45,493	2,099
Exports	(c)700	1,513
Total withdrawn	87,156	17,638
Apparent shipments to domestic customers	477,686	714,330

Refined lead produced at primary refineries in the United States, in tons:

	1946	(a)1947
From domestic ores and base bullion	293,309	400,000
From foreign ores and base bullion	44,888	55,000
From scrap	8,013	31,000
Totals	346,210	486,000

(a) Preliminary. (b) Includes an estimated 8,013 tons of secondary lead produced from scrap at primary refineries in 1946; and 31,000 tons in 1947.

MARKETS — Trends and Prices

The price situation in copper was about unchanged. Most producers, interested in maintaining an orderly market in the metal, discouraged talk of a possible rise in the price. A meeting of members of the industry and Washington officials held during the month centered around the problem of obtaining copper for the stockpile. After the meeting, it was felt that the authorities will do nothing in regard to purchasing metal for the reserve that would disturb the price structure.

Production of primary aluminum in February amounted to 45,699 tons, against 48,767 tons in January, the Bureau of Mines reports. Demand was brisk. Production was limited because of inability to obtain sufficient power. A leader in the industry declared that another round of wage increases would result in a higher price for aluminum.

Refined platinum advanced $12 an ounce troy on April 14, establishing the quotation on wholesale lots at $98 an ounce. Reduced imports, steady consuming demand, and outside speculative activity combined to create a strong price situation and general confusion in the industry.

Despite strong inflationary tendencies, quicksilver and tungsten ore were unsettled and lower. Liberal offerings of quicksilver from abroad depressed the market and caused domestic producers to either close down or greatly limit their output. Quicksilver sold on spot at $75 per flask, a decline of $1. On forward business $74 was paid.

Offerings of tungsten ore have been increasing, with most consumers, along with the Government, well supplied with the mineral. In a number of instances, foreign holders of ore were eager to sell in this market to obtain dollar exchange. Quotations on foreign ore settled at $26.50 to $27.50, duty paid, which compares with $28 to $30 a month ago.

Major Metals

U. S. DAILY AND AVERAGE PRICES

April 1948	—Electrolytic Copper— Domestic Refinery (a)	Export Refinery (b)	Straits Tin New York	—Lead— New York	St. Louis	Zinc East St. Louis
1	21.200	21.625	94.000	15.000	14.800	12.000
2	21.200	21.450	94.000	15.000	14.800	12.000
3	No Market	21.450	94.000	15.000	14.800	12.000
5	21.200	21.425	94.000	17.500	17.300	12.000
6	21.200	21.675	94.000	17.500	17.300	12.000
7	21.200	21.425	94.000	17.500	17.300	12.000
8	21.200	21.600	94.000	17.500	17.300	12.000
9	21.200	21.600	94.000	17.500	17.300	12.000
10	No Market	21.575	94.000	17.500	17.300	12.000
12	21.200	21.525	94.000	17.500	17.300	12.000
13	21.200	21.725	94.000	17.500	17.300	12.000
14	21.200	21.550	94.000	17.500	17.300	12.000
15	21.200	21.575	94.000	17.500	17.300	12.000
16	21.200	21.700	94.000	17.500	17.300	12.000
17	No Market	21.425	94.000	17.500	17.300	12.000
19	21.200	21.425	94.000	17.500	17.300	12.000
20	21.200	21.600	94.000	17.500	17.300	12.000
21	21.200	21.475	94.000	17.500	17.300	12.000
22	21.200	21.575	94.000	17.500	17.300	12.000
23	21.200	21.475	94.000	17.500	17.300	12.000
24	No Market	21.475	94.000	17.500	17.300	12.000
26	21.200	21.450	94.000	17.500	17.300	12.000
27	21.200	21.550	94.000	17.500	17.300	12.000
28	21.200	21.425	94.000	17.500	17.300	12.000
29	21.200	21.550	94.000	17.500	17.300	12.000
30	21.200	21.550	94.000	17.500	17.300	12.000
AVERAGES FOR MONTH						
April	21.200	21.534	94.000	17.212	17.012	12.000
AVERAGES FOR WEEK						
April						
7	21.200	21.508	94.000	16.250	16.050	12.000
14	21.200	21.596	94.000	17.500	17.300	12.000
21	21.200	21.533	94.000	17.500	17.300	12.000
28	21.200	21.492	94.000	17.500	17.300	12.000
CALENDAR WEEK AVERAGES						
April						
3	21.200	21.513	94.000	15.000	14.800	12.000
10	21.200	21.550	94.000	17.500	17.300	12.000
17	21.200	21.583	94.000	17.500	17.300	12.000
24	21.200	21.504	94.000	17.500	17.300	12.000

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

April 1948	Sterling Exchange "Checks"	—Silver— (c) New York	London	—Gold— London	(d) United States
1	402.500	74.625	45.000d.	172s. 3d.	$35.000
2	402.500	74.625	45.000d.	172s. 3d.	35.000
3	(e)	(e)	(e)	(e)	35.000
5	402.500	74.625	45.000d.	172s. 3d.	35.000
6	402.500	74.625	45.000d.	172s. 3d.	35.000
7	402.500	74.625	45.000d.	172s. 3d.	35.000
8	402.500	74.625	45.000d.	172s. 3d.	35.000
9	402.500	74.625	45.000d.	172s. 3d.	35.000
10	(e)	(e)	(e)	(e)	35.000
12	402.500	74.625	45.000d.	172s. 3d.	35.000
13	402.500	74.625	45.000d.	172s. 3d.	35.000
14	402.500	74.625	45.000d.	172s. 3d.	35.000
15	402.500	74.625	45.000d.	172s. 3d.	35.000
16	402.500	74.625	45.000d.	172s. 3d.	35.000
17	(e)	(e)	(e)	(e)	35.000
19	402.750	74.625	45.000d.	172s. 3d.	35.000
20	402.750	74.625	45.000d.	172s. 3d.	35.000
21	402.750	74.625	45.000d.	172s. 3d.	35.000
22	402.750	74.625	45.000d.	172s. 3d.	35.000
23	402.750	74.625	45.000d.	172s. 3d.	35.000
24	(e)	(e)	(e)	(e)	35.000
26	402.750	74.625	45.000d.	172s. 3d.	35.000
27	402.750	74.625	45.000d.	172s. 3d.	35.000
28	402.750	74.625	45.000d.	172s. 3d.	35.000
29	402.750	74.625	45.000d.	172s. 3d.	35.000
30	402.750	74.625	45.000d.	172s. 3d.	35.000
AVERAGES FOR MONTH					
April	402.614	74.625	45.000d.	—	35.000
AVERAGES FOR WEEK					
7	402.500	74.625	—	—	—
14	402.500	74.625	—	—	—
21	402.650	74.625	—	—	—
28	402.750	74.625	—	—	—

Calendar week averages, New York Silver: April 3rd, 74.625; 10th, 74.625; 17th, 74.625; 24th, 74.625.

(e) No market (Saturday).

Correction: — March average for export copper, f.o.b. refinery, 21.531c.

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(*a*) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300c. per pound, the average differential for delivery charges.

(*b*) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075c. for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month; the premium on Special High Grade in most instances is 1¼c.

Quotations for lead are for common lead.

(*c*) Determined by Handy & Harman on the basis of market prices for bar silver, in cents per troy ounce .999 fine, in amounts of 50,000 oz. or more, nearby delivery, New York. Price quoted is in cents and one-eighth cent fractions and is usually about one-quarter cent below the market to allow for delivery, carrying, and marketing. In addition to foreign silver, the quotation also applies to domestic and Treasury silver if such silver enters into the market. The Treasury's purchase price of newly mined domestic silver 90.5c. per troy ounce 1000 fine, effective July 1, 1946. London silver in pence per troy ounce, basis .999 fine.

(*d*) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

MARKETS — Trends and Prices

Miscellaneous Metals

(Monthly Averages)

Average prices of miscellaneous metals for March and April:

	March	April
Quicksilver, N. Y. flask	76.000	75.462
Antimony (a)	36.120	36.120
Antimony, bulk, Laredo	33.000	33.000
Antimony, in cases, Laredo	33.500	33.500
Antimony, Chinese (b)	....	....
Platinum, oz. troy	72.926	92.923
Cadmium (c)	175.000	175.000
Cadmium (d)	177.500	177.500
Cadmium (e)	180.000	180.000
Aluminum ingot	15.000	15.000
Magnesium	20.500	20.500

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

E. & M. J. Weighted Index of Non-Ferrous Metal Prices

100 is composite for 1922-3-4. (Copper Lead, Zinc, Tin, Silver, Nickel, Aluminum)

1938	73.67	1943	88.74
1939	77.71	1944	88.74
1940	79.22	1945	90.86
1941	83.49	1946	110.06
1942	86.80	1947	149.46

	1946	1947	1948
January	96.42	140.88	154.20
February	96.42	140.42	155.63
March	96.42	150.71	155.63
April	96.42	153.14	160.67
May	96.42	154.03	....
June	107.16	150.05	....
July	117.11	148.73	....
August	113.32	149.35	....
September	113.32	150.80	....
October	114.25	151.05	....
November	131.23	151.92	....
December	142.19	152.48	....

Official London Prices

Since Dec. 18, 1939, the British Ministry of Supply has named maximum delivered prices for the major non-ferrous metals. Prevailing delivered prices for consumers in the United Kingdom follow:

	Per Long Ton £	s.	d.
COPPER:			
Electrolytic, high conductivity	132	0	0
Fire refined, high conductivity	132	0	0
Fire refined, high grade	131	10	0
Fire refined, min. 99.2 percent	131	0	0
Fire refined, min. 99.7	130	10	0
Hot rolled black wire rods	138	0	0
LEAD:			
Soft, foreign, duty paid	90	0	0
Soft, Empire	90	0	0
English refined	91	10	0
ZINC:			
Foreign (G.o.b.), duty paid	75	0	0
Domestic (G.o.b.)	75	0	0
Prime Western and debased	75	0	0
Refined and electrolytic	75	15	0
Minimum 99.99 percent	77	5	0
TIN:			
Ingot, 99 percent	519	0	0

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated

MISCELLANEOUS METALS

(April 30, 1948)

Aluminum, ingot, 99 plus percent, lb. (base price)	15c.
Antimony, spot, lb., 5 tons and up but less than carload, in cases	36.12c.
Bismuth, ton lots, lb.	$2.00
Cadmium, commercial sticks, lb.	$1.75
Calcium, lb. ton lots, 98 percent, cast	$1.95
Chromium, 97 percent grade, lb., spot	93c.
Cobalt, 97 to 99 percent, per lb.	$1.65
Indium, troy oz.	$2.25
Nickel, electrolytic cathodes, lb., f.o.b. Port Colborne	33¾c.
Magnesium, 99.8 percent, carloads, lb., producer's plant	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation wholesale lots) troy oz.	$98.00
Quicksilver, flask of 76 lb., 25 flasks or more	$75.00
Selenium, 99.5 percent, lb.	$2.00
Silicon, minimum 97 percent, spot, carloads, lb.	14.75c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$15.00
Titanium, 96 to 98 percent, lb.	$6.00@$7.00

METALLIC ORES

Beryllium Ore, 10 to 12% BeO, f.o.b. mine, per unit	$16.00@$18.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry	
48% Cr_2O_3, 2.8 to 1 ratio	$34.00@$35.00
48% Cr_2O_3, 3 to 1 ratio	$38.00@$42.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$6.60
Mesabi bessemer	$6.35
Old Range non-bessemer	$6.45
Mesabi, non-bessemer	$6.20
Lead, (Galena) 80 percent, Joplin, Mo., ton	$231.65
Manganese Ore — Per long ton unit of Mn, basis 48 per cent manganese, subject to premiums and penalties, f.o.b. cars Atlantic and Gulf ports, duty paid, 67½@72½c.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tungsten Ore, per unit of WO_3:	
Foreign, 60 percent duty paid	$26.50@$27.50
Domestic, scheelite, 60 percent and upward	$30.00
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	27½c.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$78.00

METALLIC COMPOUNDS

Arsenious Oxide (arsenic trioxide) lb., in bbl., carload lots, delivered	6¼c.
Cobalt Oxide, 70 to 71 per cent, lb., ceramic grade	$1.27½
Copper Sulphate, 100 lb.	$7.60

ALLOYS

Beryllium Copper, 4 percent Be, per lb. of contained Be	$20.50
Ferrochrome, 65 to 69 percent, per lb. of Cr contained	18.60c.
Ferromanganese, 78 to 82 percent, gross ton	$145.00
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo, contained	95c.
Ferrosilicon, 50 percent, per lb. of contained Si	9.3c.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$2.25
Ferrovanadium, per lb. of V delivered	$2.90
Silicomanganese, 1½ percent C, per lb. contracts	7.8c.
Spiegeleisen, per long ton, 19@21%	$52.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U.S. funds), ton:	
Crude No. 1	$896@$960
Crude No. 2	$350@$545
Spinning fibers	$204@$378
Paper stock	$51@$78
Shorts	$24@$46
Vermont, f.o.b. Hyde Park:	
Shingle stock	$97.00@$107.00
Paper stock	$68.50@$85.00
Waste	$51.00
Refuse or shorts	$25.50@$46.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$11.50@$12.00
Missouri, 93 to 94 percent $BaSO_4$, per short ton	$9.00@$9.50
Bauxite, long ton:	
Domestic, crude, 50 to 52 percent (not dried)	$4.00@$5.00
Domestic, chemical, 55 to 58 percent	(a)$8.50@$9.00
Domestic, abrasive, 80 to 84 percent	$16.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, airfloated, bulk	$6.75@$8.00
Maryland, ball, bulk	$7.00@$9.00
Feldspar, bulk ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75@$12.50
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 70 percent, all rail movement, ton	$35.00
Acid 97.5 and 1 percent, bulk, ton	$42.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$27.00
Mica — Domestic f.o.b. mines. Punch, 6 to 15c. per lb. according to size and quality. Sheet, clear, 1½ x 2 inch, 60 to 65c.; 2 x 2 inch, 95c. to $1; 2 x 3 inch, $1.35; 3 x 3 inch, $1.80; 3 x 4 inch, $2.25; 3 x 5 inch $3; 4 x 6 inch, $4; 6 x 8 inch, $6. Wet ground, very fine, $125@$155 per ton. Bulk sales, dry ground, $40@$80 per ton. Scrap, $30 and up.	
Ocher, Georgia, ton, in sacks	$24.00
Pyrites, Spanish, per long ton unit of S, cif. Atlantic ports	(a)12@14c.
Sulphur, Texas, mines, long ton	$16.00@$18.00
Talc, f.o.b. works, ton:	
New York, purified	$18.50@$20.00
Vermont, extra white	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

(a) Nominal.

IRON AND STEEL

Pig Iron, Valley furnaces, gross ton: Basic	$39.00
Steel, base price, Pittsburgh billets, net ton	$45.00
Structural shapes, 100 lb.	$2.80

WASHINGTON REFLECTIONS

McGraw-Hill Washington News Bureau

Unions Falling in Line with Non-Communist Requirements

Compliance with the Taft-Hartley labor law by filing non-Communist affidavits is becoming the thing to do for more and more labor leaders. Every day, in many ways, the pressure gets stronger.

That more union leaders are abandoning the earlier position of boycotting the National Labor Relations Board is apparent from the number that have filed non-Communist oaths in recent months.

During March, the number of national unions in compliance rose from 140 to 144 and the national officers from 1,499 to 1,673.

At the local level, the rise was almost spectacular. The number of qualified locals jumped from 4,307 to 6,116 and complying local officers from 41,348 to 55,936.

CIO president Philip Murray's own union, the steel workers, were encouraged to comply when NLRB directed the Inland Steel Co. to bargain with the union on a pension plan, but only if the steel workers qualified under the law.

Many left-wing CIO unions undergoing attack from their right-wing brothers may succumb to the compulsion to comply. The Mine, Mill and Smelter Workers are being nudged by their castings division, which has gone on record for compliance. Michael J. Quill's falling out with the Communists may be the prelude to compliance by his transport workers.

Joseph Curran's National Maritime Union may also abandon the boycott if Curran wins his current control fight within the union. It was in a case involving this union that a three-judge Federal court in Washington upheld the constitutionality of the affidavit requirement of the law.

ICC Grants Additional Hike in Freight Rates

In mid-April the Interstate Commerce Commission granted the railroads an additional freight-rate increase, averaging 3.6% over the levels established last December (E&MJ, January, p. 80). The revised rates average 21.4% over the pre-October levels.

Rates for Eastern territory are now 30% above the pre-October rates. Southern territory is raised 25%, as is also Zone One of Western territory. The rest of Western territory is unchanged from the 20% above pre-October level established last December. The new rates represent increases over the January levels as follows: Eastern, 10%, Southern and Zone One Western, five percent. Permission was also given to increase rates five percent on shipments to and from Eastern territory, and between the South and West.

Special exceptions were granted in the following cases, the figures representing increases over the pre-October rates: (1) lignite coal, 20c. per net ton or 22c. per gross ton; (2) anthracite and bituminous coal, and coke, from 10 to 34c. per ton; (3) iron ore (not ground or hydrated) and iron sinter, 10c. per net ton or 11c. per gross ton to upper lake ports, and 25c. per net ton or 28c. per gross ton elsewhere; (4) aluminum ore and concentrates, copper ore and concentrates, lead ore and concentrates, zinc ore and concentrates, unground manganese ore, and chrome ore, 30c. per net ton or 34c. per gross ton; (5) aluminum, copper, lead, and zinc metal or alloys (including scrap), 14c. per 100 lbs. or $2.80 per ton, net or gross as rated; (6) sulphur in carloads, 10%; (7) spent Fuller's earth, terrazzo aggregate and crude (unground) vermiculite, 33c. per net ton; (8) fertilizers and fertilizer materials, $1.60 per net ton or $1.80 per gross ton; and (9) phosphate rock and phosphatic sand and clay, $1.20 per net ton or $1.35 per gross ton.

Government Lays Plans For Emergency Controls

Official Washington is preoccupied with the drafting of controls to cover three contingencies—a continued peace, an approaching war, and outright war itself.

The President is concerned with continued peace, and is perturbed about inflation. His economic advisors are drafting reports which would show the necessity for "restrictive" controls over the economy to keep inflation within bounds.

The military services, planning precautions against a possible war, are drafting a framework of controls over men and materials. These controls, similar to, but stronger than the allocations, preferences, and use restrictions in force during World War II, would be necessary to convert the roaring peacetime economy into one geared directly to a war effort.

The National Security Resources Board, faced with the job of planning for industrial mobilization in case of war, is drafting "standby" powers which would give the President the necessary authority to set the proposed controls in operation. These are along the line of the Second War Powers Act, which made OPA, CPA, WPB, and WMC possible by edict.

Economists advising the military services have outlined five classes of materials which "should" come under some degree of control in a war, "or sooner". They are: 1. Iron and ferro-alloy metals — iron ore, chromite, manganese, cobalt, vanadium, tungsten, titanium, nickel, and possibly molybdenum. 2. Non-ferrous and precious metals — copper, lead, zinc, mercury, cadmium, tin, antimony, bismuth, and possibly silver. 3. Fuels — coal, oil, and gas. 4. Minor metals and minerals — beryllium, tantalum, columbium, lithium, cerium and the rare earths, most alkaline metals such as thalium and potassium, monazite and other radio-actives, and the platinum group. 5. Industrial minerals and non-metallics — mica, graphite, corundum, quartz crystals, industrial diamonds, and refractories.

One group of economists has been recommending that a set of simple priorities be instituted immediately for those materials that are in short supply now. The order of precedence would be — for stockpiling, for military orders, for ERP, and for civilian industry. Whether getting a priority or not, the armed forces will be hard-boiled about one thing — stockpile buying. Far behind on its stockpiling program, the Munitions Board has shifted gear, and will be out for all it can find of several commodities already in industrial short supply, with three times as much money as heretofore, to do it.

In addition, the stockpilers, with $375,000,000 in contract authorization (asked by the President recently) for next year's stockpiling, will be out to pick up any surplus production lying around the rest of the world.

The planners of controls are worried about the fact that no matter what types of controls are put up, the Congress still has to pass the legislation for them. No one will even guess whether Congress will accept controls or not after elections, unless the international situation gets worse.

House Leadership Refuses To Accept Russell Bill

A political decision on how mining incentive legislation would be allowed on the floor of the House of Representatives has brought out a new idea for Government help to the mining industry.

Rep. Charles A. Halleck of Indiana, majority leader of the House, ruled in mid-April that any amendments to the Russell Bill (H.R.2455) would have to be based on national defense needs and be acceptable to the Secretary of Defense and the House Armed Forces Committee.

When earlier proposed amendments (E&MJ April Reflections) were shown to representatives of the Administration, the Government spokesmen labeled them "pork barrel" and would not accept them.

This caused the advocates of the legislation to change their tack. Result of the revised thinking was language envisioning "contract incentive conservation payments" for the production of manganese, copper, lead, and zinc. This would provide yearly contracts between the director of the "mine incentive payments division" of the Bureau of Mines, and individual mine operators, to reward increased production. The contracts would provide an estimated operating margin for copper, lead, and

zinc equivalent to 25c. per ton of crude ore, plus depletion calculated at 10% of the net sale value (at mine); provided such estimated margin be limited to two cents per pound of recoverable metal for newly mined ores and one cent per pound for tailings, etc. Incentive conservation payments would be in addition to the amount received by the producer from the sale of the ore, with a limit of six cents per pound of recoverable lead and/or zinc, and eight cents per pound of recoverable copper.

For manganese, the contract would provide an estimated operating margin, after reasonable costs, equivalent to five percent of the market price per unit of recoverable maganese, plus depletion calculated at 15% of the net sale value of the product (at mine); provided such incentive contract payments, plus the market price, be made only on ores having at least 40% metallic manganese content.

For strategic minerals and metals other than copper, lead, zinc and manganese, the contracts would provide an operating margin equivalent to five percent of the market price per unit of recoverable product plus depletion calculated at 15% of the net sale value of the product at the mine.

In addition to the production incentive, there would be an automatic incentive exploration payment for copper, lead and zinc. This would be equivalent to two-thirds of the sums spent for such purposes, up to maxima based on production. The maxima would be: seven cents per pound for the first 250 tons of metal produced during any calendar year, with graduations of one cent for each additional 250-ton increment, down to 1½c. per lb. for all metal produced in excess of 1,500 tons and less than 2000 tons. Operating expenses of any mine producing less than 500 tons per year of copper, lead and zinc would be considered as exploration and development expense.

National defense angle to the idea is that any metal resulting from the contract incentive, (all production over an established norm for each mine) would go into the military stockpile. In addition, inclusion of metallurgical research as an allowable exploration expense might lead to advanced technology and greater recovery of important byproducts of smelting and refining.

It is understood that this plan has been worked out in consultation with Administration representatives and thus will be acceptable to Executive agencies in approximately the present form.

When the Interior Department advisory council met on April 29, it condemned subsidies for peacetime purposes, but sanctioned them for emergency conditions. It called upon defense authorities to decide if a sufficient emergency exists at present.

Testifying before the mines and mining subcommittee of the House Committee on Public Lands in regard to the need for accelerating stockpile acquisitions, Rear Admiral Roger W. Paine, executive secretary of the Army-Navy Munitions Board, endorsed subsidies for "critical" metals. Thus, it appears that the stage is set for passage of a subsidy measure in approximately the form given above.

Protest Closed Session On Trade Agreements

Pursuant to an announcement that the House Ways and Means Committee would not hold public hearings over renewal of the Reciprocal Trade Act, various foreign trade groups, including the National Foreign Trade Council, Inc., have issued protests. This action is out of fear that the Republican leadership in Congress will allow the reciprocal trade legislation to expire.

A realistic view is that the circumstances suggest a one-year renewal of the Act. It would be an improper procedure on Congress' part either to pass or to permit expiration of such important and controversial legislation without public hearings. Also, if the Republicans intend to scuttle trade agreement legislation without hearings they will find themselves accused of isolationist aims, which at the present time have an unpopular conntation. Thus, all factors suggest a short-term continuation of the status quo.

Low-Cost Power Shortage Limits Aluminum Supply

The aluminum industry is looking for advantageous areas in which to expand its base metal production. The prerequisite is availability of cheap power. Texas might be the place. The Gulf Coast has an abundance of natural gas, which can be converted into electricity. In addition, location of reduction plants on the Texas coast would affect a great saving in the cost of shipping alumina, which is now going from the lower Mississippi area to the West Coast at a high cost for freight. If aluminum plants were established in Texas, the alumina could be hauled to them by barges at a great savings. The Big Three of aluminum—Alcoa, Reynolds and Kaiser—all have alumina plants with in barge distance of Texas points.

The only obstacle to the selection of Texas is the cost of the natural gas and the reluctance of gas producers to commit themselves to any long-term agreement for large quantities of their product.

The Aluminum Company has led the search and has taken an option on a 3,000-acre plot at Port Lavaca, Texas, close to the Refugio gas field, one of the largest. So far, the company has not completed negotiations for gas, either on price or quantity. There should be some results, one way or another, shortly. The company's two competitors would probably build in the State if Alcoa is successful in obtaining cheap power. Alcoa's plans entail building a plant having a capacity of 70,000,000 lb. per year and having it ready in 12 months.

Shortage of power has been whittling down the industry's ability to produce, at a time when demand is even greater than anticipated. With pot lines idle, current production of pig aluminum is several hundred million pounds less than what it otherwise would be. The remelt supply of 150,000,000 pounds a year (from surplus airplanes) is gone. As a result, the industry is faced with a shortage of metal. which is growing daily.

Aluminum Co. of Canada, with a huge production potential, gives reason for speculation. It has abundant power but rented about half of it last year when its markets dwindled. Now it seeks to get this power back. There are good reasons why it should be anxious to get back to full production and ship to American markets. It has one of the lowest costs in the world. Shipping distances to the principal American markets are shorter for the Canadians than for the American companies. The United States tariff on foreign aluminum was reduced recently by one-third. The Canadian need for dollars is great.

Bureau May Experiment on Iron Ore Beneficiation

The Bureau of Mines is thinking of reentering the field of iron ore beneficiation research, utilizing gases from lignite. This will be possible when the Bureau's new lignite research laboratory at the University of North Dakota is completed, probably next year.

Congress has authorized $750,000 for the building and equipment of the lignite laboratory, and an annual appropriation of $250,000 for its operation. The money hasn't actually been appropriated yet, and construction will be held up until the money becomes available.

Basing-Point Practices Jeopardized by Decision

On Apr. 26 the United States Supreme Court handed down a decision which raises considerable doubt over the legality of basing-point practices in the metal industries.

Finding against a group of cement companies and upsetting a circuit court decision that the Government had failed to prove its case, the high court ruled that to act in concert to maintain a multiple basing point system constitutes unfair competition and discrimination violating both the Federal Trade Commission Act and the Clayton Act.

Inasmuch as the court found that the defendants had conspired to restrain trade, it is not clear how the decision applies to instances where collusion does not exist or where basing points are not used to restrain trade. Justice Black, who wrote the majority opinion, stated that the FTC order was directed solely against concerted activity. Justice Burton, in his dissent, wrote, "This court . . . has not passed upon the validity of freight absorptions made in sales by one or more producers in the course of bona fide competition. . ."

NEWS OF THE INDUSTRY

Zinc Institute Speakers Predict Continued High Demands But Differ on Supply Adequacy

Meeting in St. Louis on April 15-16 for its thirtieth annual gathering, the American Zinc Institute offered a program of considerable interest to zinc producers, sellers and consumers. Attendance was over 360. In his report the Institute secretary, Ernest V. Gent, described the zinc-use promotion, statistical, and public relations activities of the organiaztion.

R. D. Stewart, of United Co-Operatives, Inc., speaking on "What's Ahead for Metals in the Farm Market," said there will be a good farm market for all galvanized sheets that can be produced, which will be shared with aluminum and other roofing materials. The farmer wants quality goods and the speaker warned it would be a great mistake to market poor products. He remarked that 80% of the sheets sold by his organization are Seal of Quality (2-oz. coating), also that more aluminum than galvanized sheets are now going to market.

Discussing "Opportunities to Serve the Farm Market," Prof. D. G. Carter, of the University of Illinois, demonstrated a great need for modernization of farm buildings and praised the constructive work of the Institute to this end.

R. C. Todd, of Armco Steel Corporation (formerly American Rolling Mill Co.), speaking on "The Steel Industry in 1948," upheld the steel industry's much criticized production and price policies.

On the subject, "The Zinc Smelting Industry in 1948," Richard A. Young, American Zinc, Lead and Smelting Co., described the 1947 status of the industry as almost identical with that of 1941, and not likely to expand in 1948 despite improved demand. He pointed out that Government metal available for consumers is down to 25,000 tons, industry stocks are at an irreducible minimum, and an increased use of established capacity would probably be required for conversion of Government concentrates. Losses in capacity have exceeded additions, accomplished or planned. He estimated "economic" capacity for 1948 at 900,000-925,000 tons, but, considering probable interruptions, an actual output of about 850,000 tons. He stated that, whereas in 1940 capacity was about equal among gas-fired horizontal retorts, coal-fired horizontal retorts, electrolytic plants, and "others" including secondary, by 1947 electrolytic capacity had greatly increased, gas-fired and "others" grew moderately, and coal-fired capacity had declined 25,000 tons. He predicted further declines in coal-fired horizontal retort capacity and a consequent reduction in Prime Western production.

Addressing the group on "Washington News," J. D. Conover, secretary of American Mining Congress, condemned the recent coal strike, described tax reductions, and stated that the outcome of premium-price legislation is unpredictable. He anticipated passage of trade-agreement renewal legislation and a bill returning tidelands to the states. The St. Lawrence seaway and transfer of U. S. Employment Service to the Labor Department was rejected.

Dr. James Boyd, director of the U. S. Bureau of Mines, spoke on "The Bureau of Mines and the Mining Industry." Mentioning the vital importance of minerals to modern civilization, the great depletion rate of recent years, and the impossibility of full self-sufficiency, he pointed out that mineral policy problems are conditioned by security as well as economic needs. He proposed improved incentives for venture capital, more research, better prospecting techniques, access transportation, market data, and public education.

Discussing "Industrial Relations," Herman Steinkraus, president, Bridgeport Brass Co., urged employers to accept unions as here to stay, and to cooperate toward making them constructively successful. Stating that over the long pull, the kind of unionism obtained reflects the management given, he stressed the importance of foremen and foreman education, the great opportunity for improvement of labor efforts, and the need to sell the job to the worker. Affirming that top management must take an interest in labor relations, he suggested keeping workers regularly and promptly informed of company plans and policies. Pointing out the political aspect of union conduct, he urged a patient attitude toward extravagant demands.

Walter A. Patton, St. Joseph Lead Co., chairman of the Institute Traffic Committee, described recent freight-rate hearings and decisions, and related how the committee had avoided an increase in freight rates and obtained parity treatment for zinc concentrates, iron ore and aluminum. The excellent work of the committee was warmly praised by the convention.

Speaking on "The Mining Engineer's Place in the Current Economy," Dr. C. L. Wilson, dean of the Missouri School of Mines and Metallurgy, urged industry to give increased support to fundamental research and to take a greater interest in educational problems and technical graduates. The mining engineer's job is to advance and apply research, to help persuade labor toward a more constructive attitude, to participate in community activities, to maintain a professional status, and to strengthen professional organization.

J. K. Richardson, manager, Utah Mining Association, discussed "Zinc Mining in the Western States." He pointed out that labor shortages and inefficiency are continuing problems and that the West is handicapped by high freight charges. He stated that Western operators greatly fear peace-time subsidies as a threat to free enterprise, but are trying to find an acceptable solution to the problem of encouraging exploration and helping marginal operations. He predicted production of approximately 369,000 tons of recoverable zinc from the Western states in 1948, including increases from Arizona, Idaho, Montana, New Mexico, and Washington.

On the subject, "Zinc Mining in the Central States," O. W. Bilharz, Bilharz Mining Co., showed the marked decline which has taken place in Tri-State production in the last few years, and predicted a further decline in 1948. Comparing the years 1947 and 1948, he anticipated a drop in ore tonnage from 600,000 to 350,000 tons and a 1948 zinc concentrate production of about 120,000 tons. He expected lead concentrate production to hold at approximately 25,000 tons. Referring to the Galena-Platteville area, he predicted that losses from cleaning up of the Metals Reserve stockpile would be made up by new production, chiefly from Eagle-Picher's new mine.

R. J. Mechin, mgr. Edwards Div., St. Joseph Lead Co., speaking on "Zinc Mining in the Eastern States," compared 1947 and 1948 (estimated) production, in tons: Eastern states, 1947—158,810 (1948, estimated—161,000); Central states 132,000 (91,000); Western states 334,198 (369,000).

Mr. Mechin said that Eastern mining had been somewhat hampered by a shortage of underground work and complained of unwillingness on the part of young men to do hard work. Better management and mechanization has offset the poorer performance of labor. He mentioned the new operation of the New Jersey Zinc Co. in the old Friedensville, Pa., district, where a new shaft is now being sunk. He affirmed the ability of Eastern mines to operate without subsidies and consequent Government control.

Addressing the group on "The World Situation in Zinc," Simon D. Strauss, sales manager, American Smelting and Refining Co., estimated that Russia and its satellites produced something less than 350,000 tons in 1947, probably about 200,000, whereas the non-Russian world has a total supply of 1,625,000 tons. Of this, the United States can produce 870,000 tons, two-thirds from domestic ores and scrap.

Australian production is bottlenecked by transport difficulties. New production will come from the Tsumeb mine in Southwest Africa and an increase from Katanga, where an electrolytic plant is

planned for 1951. Belgian smelter production is being held to 12,000 tons per month by exchange difficulties and coal shortages. Holland is in similar condition at 1,250 tons per month. Little change is expected in Norway, France and Italy. German production in the Western zone is about 2,000 tons per month, a small fraction of plant capacity. The plant at Magdeburg has been moved to U.S.S.R.

The United States is now getting the bulk of Western Hemisphere concentrate exports, which formerly went to Europe, and domestic smelters are demonstrating their capacity to compete for foreign concentrates. Two new mines — Quemont and East Sullivan — are coming into production in Eastern Canada and possibly a third — Reeves-McDonald — will open in British Columbia. Argentine production (Aguilar) is hampered by transport difficulties. The roasting plant and smelter in Argentina will not open until 1949.

Strauss estimated that over the next several years supplies would meet effective demand with a substantial margin available for stockpiling. He estimated demand outside Russia as 800,000 tons foreign and 700,000 tons domestic.

Two films were shown during the meeting, "Must It Rust?" by the Hot Dip Galvanizer Assn. and "The Paint Film," by the New Jersey Zinc Co.

Howard I. Young was re-elected president of the Institute and E. V. Gent made executive vice president. C. M. Chapin, O. W. Bilharz and Russell Caples were elected as vice presidents and Raymond Orr, treasurer. W. B. Porter and Raymond Orr were elected as directors, replacing H. E. Son and Chas. T. Orr, resigned.

Robinson Ordered Deported by Canadian Board

A Canadian immigration board has ordered the deportation of Reid Robinson, eastern vice president of the International Union of Mine, Mill & Smelter Workers, under a section of the Immigration Act that bars from Canada persons advocating the overthrow of the government by other than peaceful means. Mr. Robinson was arrested in Timmins, Ont., March 22 and brought to Toronto for an investigation into his activities in Northern Ontario.

G. A. Martin, counsel for Mr. Robinson said that appeal would be made to the Federal Minister of Mines to have the verdict reversed; and in case the appeal was disallowed, he would contest the legality of the deportation order through habeas corpus proceedings. The defendant was released on $500 bail pending the appeal and upon condition he reports to the immigration authorities daily.

Reid Robinson, in a prepared statement issued after the ruling, stated that he was innocent of all charges against him, that all he had ever advocated was "organization of workers to raise their living standards and thereby benefit the whole community." He entered Canada on Jan. 24, 1948, and departed on Feb. 2, 1948, as accredited representative of the IUMMSW, then entered again on March 4, according to James A. MacKinnon, Cabinet member.

U. S. Atomic Energy Commission Announces Program To Stimulate Production of Domestic Uranium

The Atomic Energy Commission in Washington announced on April 11 a three-point program to stimulate the discovery and production of uranium in the U. S. by private competitive enterprise. Major elements of the program are:

Minimum Prices

AEC guarantees the following minimum prices for delivery of domestic refined uranium, high-grade uranium-bearing ores and mechanical concentrates for ten calendar years:

Uranium-bearing ores and concentrates, $3.50 per lb. of recoverable uranium oxide, less cost per lb. to refine to necessary purity as determined by AEC after assay of a representative sample. Refined uranium products, $3.50 per pound of uranium oxide.

The prices established are minimum prices for small lots. Higher prices may be established by negotiation with the seller for larger quantities. The Commission will give consideration also to the presence of recoverable gold, silver, radium, thorium and other valuable constituents of the ores, depending upon cost of recovery.

Special Incentives

To stimulate prospecting for new high-grade domestic uranium deposits, other than so-called carnotite—or roscoelite—ores, AEC will pay in addition to the purchase schedule prices a bonus of $10,000 for the production, upon delivery to the Commission, of the first 20 short tons of uranium ore or mechanically produced concentrates assaying 20 per cent or more uranium oxide from any single lode or placer mining location on the public domain which has not previously been worked for uranium, or from a comparable area on private property. The discovery bonus will be paid only once for production of ore from any single lode or placer location, but the same person may receive a bonus for production from each new location. A special development allowance in addition to the base price has been provided to encourage discoveries of carnotite—or roscoelite—ores.

Colorado Plateau Ores

AEC guarantees a minimum price schedule for delivery of carnotite—or roscoelite—type ores at Monticello, Utah, or Durango, Colorado, under which producers will receive $20.40 per ton for ore containing 2 per cent vanadium oxide and 0.2 per cent uranium oxide. The minimum prices are effective for three calendar years.

The schedule provides for payment of $1.50 per lb. of uranium oxide (U_3O_8) for ores assaying 0.20 per cent, plus a development allowance of 50c. per lb. Premiums will be paid for certain higher grade ores, and a lower price for ores containing less than 0.20 per cent uranium oxide; no payment for ores containing less than 0.10 per cent. Payment also will be made based on vanadium oxide content of the ore at 31c. per lb. for an amount not exceeding 10 lb. for each pound of uranium oxide. No payment is to be made for vanadium oxide in excess of this amount.

The Monticello purchase depot is expected to be ready to receive ore during July, 1948, and the Durango depot shortly thereafter. Ore buying will be handled by private contractor. The Commission is being advised on administration of the program by American Smelting & Refining Co.

Circulars describing the ore-buying program are available from the U. S. Atomic Energy Commission, Washington 25, D. C., and from the AEC offices in Grand Junction, Colo., and at 70 Columbus Ave., New York City.

Consolidated Mining Lifts Ore Purchasing Schedule

Custom mines shipping lead ore or concentrate to the Trail smelter of Consolidated Mining & Smelting Co. of Canada will receive an increase in payments, it was announced early in April.

Under a revised schedule, the shipper will be paid for 92½ per cent of the lead in his ore or concentrate instead of 90 per cent, and the treatment charge of $12 per ton will be reduced by 10c. for each unit of contained lead over 30 per cent. A shipper, under the revised schedule, can improve his returns by sending in high-grade ore or concentrate. On 60 per cent concentrate, it is pointed out by the company, the shipper will now be charged only $9 per ton, against a treatment charge of $12 under the old arrangement.

The official announcement on the schedule now in effect adds:

"The custom shipper received another benefit earlier in the year. On Jan. 7, the United States railroads substantially increased their freight rates and thus reduced the returns received by the smelter for refined metal sold in the United States. The smelter at Trail absorbed the drop in net returns and continued to pay custom shippers on the same basis as before the freight rate increase became effective."

Phelps Dodge Plans Smelter for Arizona Open Pit Mine

The Phelps Dodge Corporation plans to construct a $5,000,000 copper smelter at its Ajo, Arizona, open pit mine. The smelter will have a capacity of 190,000 tons of concentrate a year, and construction is expected to be completed in about two years. Ajo concentrate at present is being shipped to the company's Douglas smelter.

State Geologists Celebrate Founding of Alabama Survey

Geologists from about 35 states were represented at the annual convention of the Association of American State Geologists held at Tuscaloosa, Ala., to celebrate the centennial of the founding of the Alabama Geological Survey. This was the second time within recent years that this body has met outside of Wahington.

Capt. Garland Peyton, state geologist of Georgia, was elected president; W. M. Laird, state geologist of North Dakota, was named vice president; and E. L. Clark, state geologist of Missouri, was elected secretary-treasurer. Dr. Walter B. Jones, state geologist of Alabama, was named president-elect for 1949.

Cerro de Pasco Mine Fire Costs Fifty Lives

A serious accident occurred on April 19 at the Casapalca mine of the Cerro de Pasco Copper Corporation in Peru when a fire broke out in the underground hoistroom on the 2700-ft. level which serves the Aguas Calientes shaft. Smoke and carbon monoxide were carried through the downcast shaft, asphyxiating about 50 men who were working between the 2700 and 3300 levels. Monte McCutchan, assistant superintendent, was among those who lost their lives. Exact causes of the accident will be determined by a Government commission now investigating the disaster. Monte McCutchan is a brother of Vernon McCutchan, operating manager for Cerro de Pasco.

Magma Copper Co. Develops Orebody at San Manuel

The drilling campaign at the San Manuel (Arizona) property of Magma Copper Co. has developed the following estimated tonnage of ore, according to the annual report to stockholders:

	Tons	Percent Copper
Oxide ore	123,499,580	0.767
Sulphide ore	339,284,920	0.788
Total	462,784,500	0.782

The orebody, the company believes, is the second largest tonnage of copper in any known orebody in the United States. To determine its value accurately, close estimates of operating and capital costs must be made.

Basic Magnesium, Inc. Sold to State of Nevada

The War Assets Administration announced last week that it has disposed of its 140-million-dollar magnesium plant at Henderson, Nev., to the State of Nevada for 40 million dollars under the following conditions:

The State, acting through the Colorado River Commission, will pay $1 upon transfer of the property and will turn over to the Government all net revenues obtained from operation or lease of the plant for the next 20 years or until the purchase price is paid. The sale price is equivalent to about 96 per cent of the appraised fair value of the plant.

During the war period the plant was known as Basic Magnesium, Inc., originally sponsored by Basic Refractories Corporation and later operated by Anaconda Copper Mining Co.

O'okiep Copper Co. Reports Discovery of New Orebody

H. E. Dodge, secretary of O'okiep Copper Co., Ltd., has reported the discovery of an important new orebody at Concordia, Cape Province, South Africa, approximately ten miles east of the company's Nababeep mine and smelter. Three diamond-drill holes spaced 100 ft. apart along the strike have shown an average thickness of 212 ft. of ore, averaging 5.93% copper at a depth of 500 to 700 ft. below the surface.

1948 Antimony Supply to Remain Below U. S. Needs

The supply of antimony is far below the consumption requirements of the United States, in the opinion of E. R. Dondorf, manager of metal purchases, National Lead Co., who spoke before the Lead Industries Association recently. The situation seems to be getting progressively worse, he declared, and a continuation of control for antimony, as in tin, is likely after May 30, 1948.

Antimony supply, consumption, and stocks, based on figures compiled by the Office of Materials Distribution, in tons:

	1947 (a)	1948 (b)
Supply:		
U. S. mine output	4,912	4,800
Imports in ore	8,761	6,000
Imports of metal	4,462	4,000
In scrap	20,424	18,000
Totals	38,559	32,800
U. S. consumption:		
Alloys	30,836	28,000
Paint and lacquer	1,402	1,400
Frits and enamels	1,747	1,700
Flameproofing	157	400
Other uses	3,224	3,500
Processing losses	2,338	2,400
Totals	39,704	37,400
Exports	1,512	2,000
Consumption and exports	41,216	39,400
Stock end of period:		
Government	6,700	100
Industrial (primary)	6,700	6,700
Scrap	2,500	2,500
Totals	15,900	9,300

(a) Preliminary. (b) Estimated.

Commenting on the Government's statistics, Mr. Dondorf said he is not too sure that the United States will obtain the estimated supply of 32,800 tons of antimony during 1948, because in this total are included 4,000 tons of metal that are expected to come here from China.

Humphreys to Mine Ilmenite for duPont Company

Mining operations of the duPont interests at Camp Blanding, near Starke, Fla., will be handled by the Humphreys Gold Corporation, of Denver. The duPont company leased 4,000 acres at the wartime training camp and plans to mine ilmenite, which was recently discovered in the area. Construction of a plant is to begin in the immediate future with mining to start before the end of the year.

Tentative List of Speakers for Idaho Mining Assn.

Dr. James A. Boyd, Director of the United States Bureau of Mines, will be the chief speaker at the Idaho Mining Association meeting at Sun Valley, Ida., May 31 through June 2, if the coal strike situation does not interfere. The former dean of the Colorado School of Mines is highly regarded among Western mining men as a scientist, administrator and speaker, and his appearance in Idaho will add much interest to the program. Harry W. Marsh, secretary of the Association, has announced other highlights of the meeting as follows:

There will be a report on the multi-million-dollar development of the cobalt deposit at the Blackbird mine near Forney, which Howe Sound interests have promoted for several years, by Edwin B. Douglas, manager of Calera Mining Co. Robert Sorenson, chief geologist of Hecla Mining Co., will give news of the recent strike at the Silver Summit mine between Wallace and Kellogg, which is expected to add years of life to the Coeur d'Alene district.

Dr. Donald H. McLaughlin, president of the Homestake Mining Co., will speak on "Mineral Policies." William T. Nichols, technical assistant at Westvaco Chlorine Products Corporation, will discuss the phosphorus project of his company near Pocatello. J. R. Simplot, of Boise, will report his activities in the phosphate field at a round table session. Another forum speaker will be J. D. Bradley, of Bradley Mining Co., describing his company's plans for an antimony smelter in Idaho.

Other outstanding speakers announced are Dr. Carlton D. Hulin, department of geological science, University of California; Ira B. Joralemon, consulting geologist of San Francisco; John Parks Davis, San Francisco attorney; Oscar W. Worthwine, Boise attorney; Max Yost, secretary of the Associated Taxpayers of Idaho; Jean McCallum, general manager of the Texas Mining and Smelting Division of the National Lead Co.; William Reinhart, vice president of Union Pacific Railroad in charge of oil operations; and J. E. Buchanan, president of the University of Idaho. Governor Robins will give the welcoming address at the convention opening.

Canadian Institute of Mining and Metallurgy Holds Golden Jubilee Meeting at Vancouver

Celebrating the 50th anniversary of its incorporation as a national institution, the Canadian Institute of Mining and Metallurgy held its Golden Jubilee meeting in Vancouver, B.C., April 5 to 8. Registration exceeded 1,100, with more than 850 delegates representing all branches of the industry and many distinguished visitors.

Technical sessions were arranged to provide topics of wide appeal. Reviews of progress in mining and metallurgy during the past 50 years were accompanied by forecasts of future developments. The tone of the meeting was one of judicious optimism tempered by cautious appraisals of the many serious problems confronting the industry.

Divisional Conferences

The annual conference of the five technical divisions of the Institute were convened following registration. Chairmen of the various meetings were: Geology Division, Dr. J. F. Walker, Deputy Minister of Mines for British Columbia; Industrial Minerals Division, F. V. Seibert, Industrial Commissioner, Canadian National Railways; Metallurgy Division, Van H. Smith, manager for Canada, North American Cyanamid Co.; Metal Mining Division, R. D. Parker, general superintendent of mining and smelting division, International Nickel Co. of Canada.

Emphasizing the suitability of holding the Jubilee meeting in British Columbia, the birthplace of mining in Canada, Hon. R. C. MacDonald, Minister of Mines for British Columbia, welcomed the delegates at the first luncheon. At this meeting H. DeWitt Smith told of the success achieved by the Newmont and American Metal companies in bringing into production again the important Tsumeb lead-copper property in southwest Africa.

Inaugural Session

Presided over by Institute president. Dr. Charles Camsell, and R. H. Stewart, past president, the inaugural general session heard greetings from mining and metallurgical societies and institutes in all parts of the world.

A statistical and pictorial presentation by W. H. Losee, Dominion Bureau of Statistics, traced the growth of Canadian mining during the half century from the founding of the Institute to the present. From 38 million dollars in 1898, the value of production in 1947 had increased to 619 million, with every indication that the next few years would witness even more rapid growth.

In his presidential address, Dr. Camsell urged encouragement for young men, on whom the future of mining must depend. He recommended speeding up reconnaissance mapping to aid prospectors and developers, and criticized Canadian legislation which tends to retard the industry's growth. Advocating a higher price for gold as essential to the miners, he also urged that the search for oil and gas be pursued relentlessly.

Technical Session

The feature of the Geology Division meeting was the paper by Hans Lundberg on "History of Geophysical Exploration." Use of modern electronic devices carried over favorable terrain in helicopters, supplemented by the rapidly developing science of soil and plant analyses to indicate the presence of larger than usual amounts of certain elements, may soon almost supplant the more conventional methods of mine finding, according to Dr. Lundberg, and in a short time will be employed as routine practice by engineers, geologists and prospectors. The papers, "Mining Geology in Canada," by G. B. Langford, and "The Kirkland-Larder Lake Area," by J. E. Thompson, were also well received.

Development of the spectroscope for determining potash in drill cores, by Dr. M. H. Haycock of the Bureau of Mines, Ottawa, and his associate, L. R. Russell, was described in their paper, "The Spectographic Determination of Potash in Rock Salt." This method solved the problem of analyzing the many samples taken in drilling the newly found Saskatchewan potash deposits.

L. H. Cole, of the Department of Mines, Ottawa, in "Potash in Western Canada," outlined the development of a potentially important commercial deposit of potash in Saskatchewan. Wells drilled for oil, gas, and salt point to the presence of a great salt basin in western Canada. In the Verbata No. 2 well, near Unity, Sask., a bed 11 ft. thick at 3,466 ft. depth ran 21.64% potash, the highest concentration found.

The asbestos industry has a bright future. Scientific assistance to producers has made it possible to process the raw product into forms required in various manufactures, and research into new methods is continuous, according to M. S. Badollet, of Canadian Johns-Manville Co., in his presentation of "The Future of the Asbestos Industry." C. H. Wright, chief chemist for Consolidated Mining and Smelting Co., emphasized the importance of common industrial minerals, sulphur, limestone, salt, and natural gas in developing a chemical industry.

The Milling Division

Under chairmanship of Van H. Smith, and led by H. R. Banks of Kimberley, B.C., Bertrand Robinson, of the Hardinge Co., and David Livingstone, of Val d'Or, Que., previously submitted questions on various aspects of milling practice which were discussed at length in a round-table conference.

Ideas, suggestions and ensuing discussions proved this conference to be a particularly worthwhile means of enlightenment as to metallurgical problems.

Second General Session

At the second general session, held April 6, the address of Dr. R. C. Wallace, of Queen's University, on "Education in Mining and Geology" was outstanding. Dr. Wallace was addressing an audience composed of mining men from all parts of Canada, many of whom were educated at Queen's, and he spoke freely on the need for more adequate training to meet the demands of the present day. "Industrial Minerals and the National Economy" was presented by M. F. Goudge of Ottawa. Construction of a cylindrical concrete headframe 30 ft. in diameter and 128.5 ft. high, requiring 1,279 cu. yd. of concrete and 50 tons of reinforcing steel, was described in a paper by the staff of Canadian Johns-Manville Co., Asbestos, Quebec.

Awards and Honors

The annual dinner was the occasion for the presentation of numerous awards. The highest, the "Medal for Bravery," was presented to Ralph Wallin, miner at Sullivan mine. President-elect R. W. Diamond, vice president and general manager of the Consolidated company, was awarded the first Selwyn G. Blaylock Medal for distinguished service to Canada through exceptional achievement in the field of metallurgy.

The Barlow Memorial Medal, for the best paper on a geological subject, was awarded to Dr. Neil Campbell of Yellowknife, N.W.T., for "The West Bay Fault." Dr. Campbell advanced the theory, since proven in underground development, that the faulted extension of the Giant Yellowknife shear zone would be founded at moderate depth in the adjoining Con and Negus mines.

R. J. Ennis, vice president of McIntyre-Porcupine Mines, received the International Nickel medal. The Leonard Medal, of the Engineering Institute of Canada, was awarded to Dr. G. S. Hume, of the Geological Survey. The Institute's student prize went to W. K. Congreve, University of Alberta.

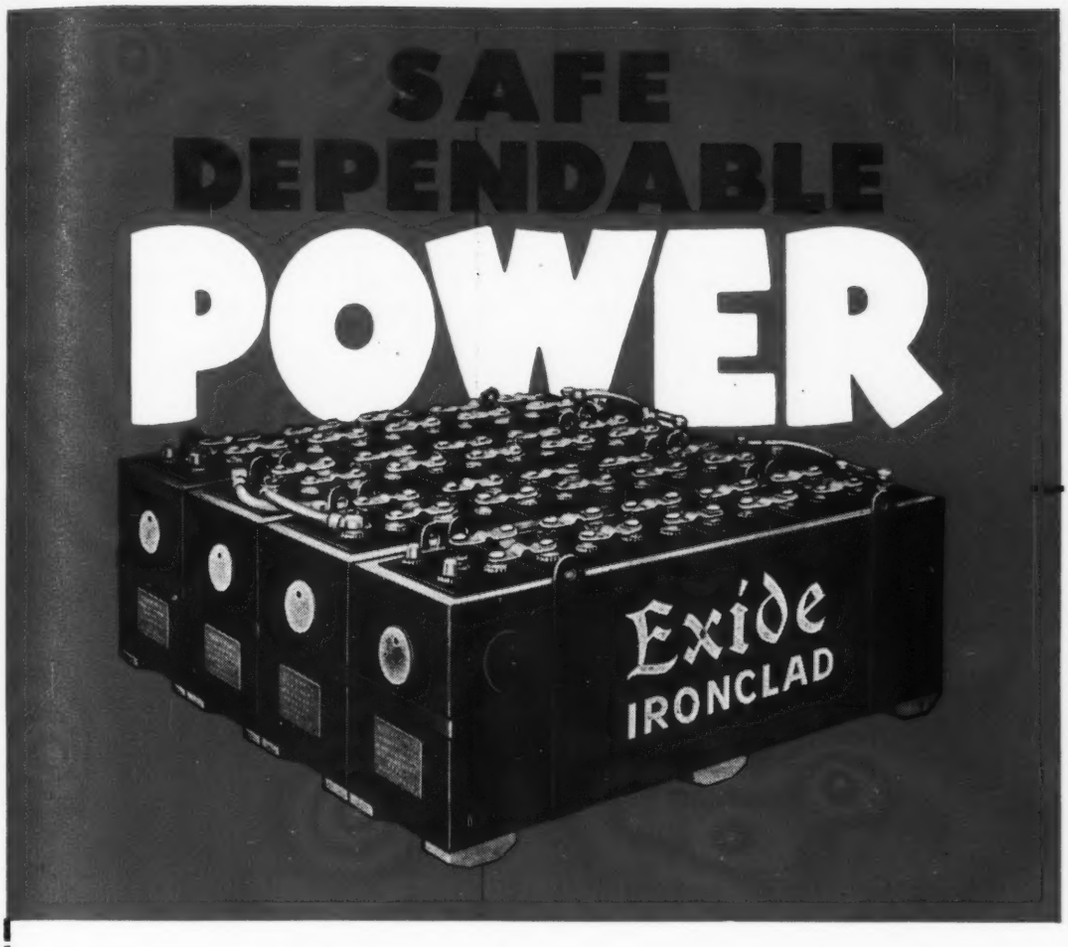
The John T. Ryan safety awards were won by International Nickel's Levack mine at Sudbury and the Cadomin Coal Co., Cadomin, Alberta. Certificates of honorary membership were presented to C. P. Browning, formerly general manager of Britannia Mining & Smelting Co., and George C. Bateman, formerly Metals Controller for Canada.

Charles A. Banks, Lieutenant-Governor of British Columbia, and managing director of Bulolo Gold Dredging, Ltd., was the dinner speaker. He related the wartime story of Bulolo and post-war achievements in bringing the big dredging operation back into production.

Metal Mining

At the Metal Mining sessions, P. T. Bloomer, of the Consolidated staff, described the extraction of pillars at the Sullivan mine, where 14% of the daily mill tonnage of 8,500 tons comes from pillars. Backfilling methods, using pyrrho-

Continued on page 117



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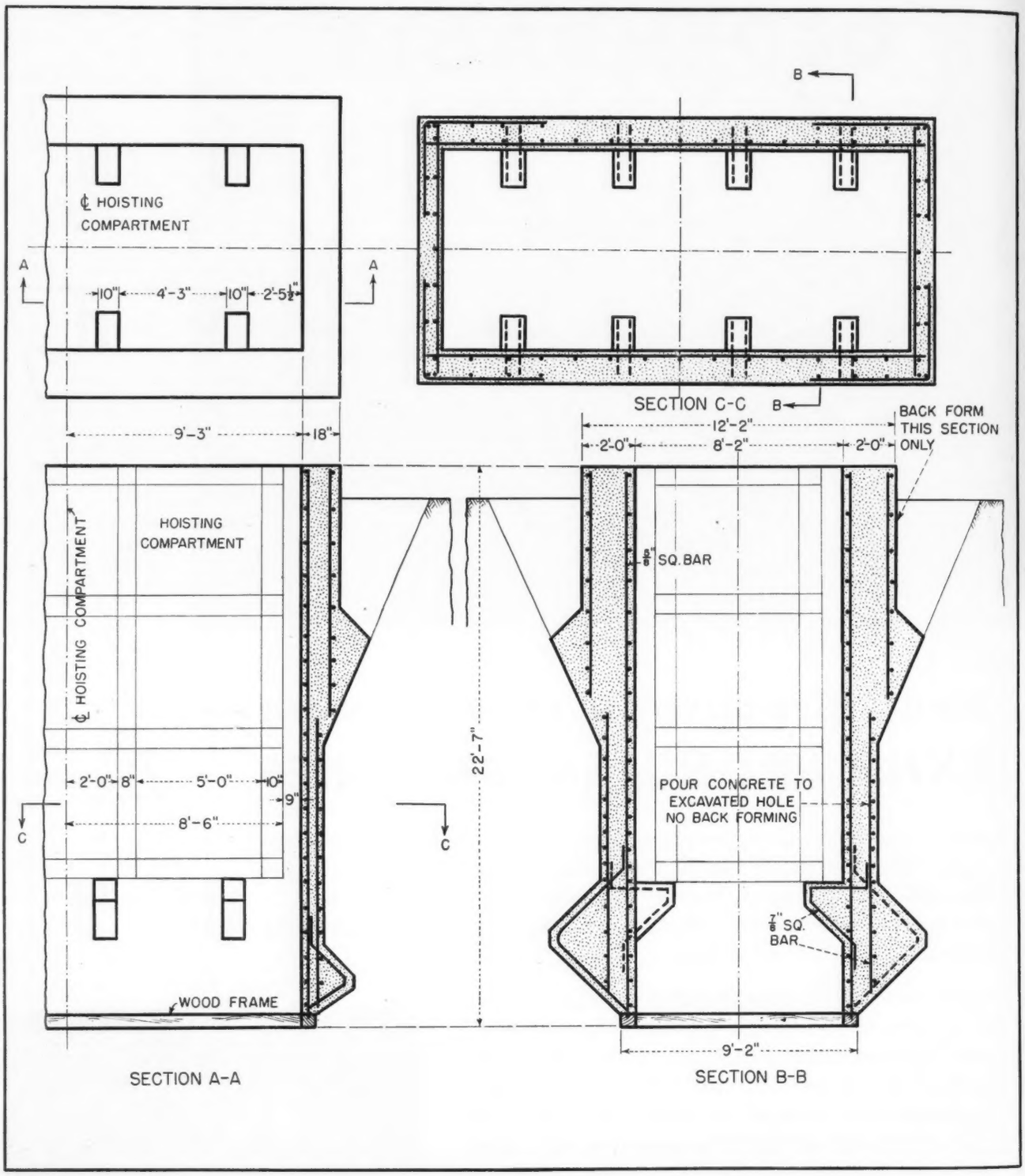
OPERATING IDEAS



Stable Reinforced Concrete Shaft Collar

Easily installed, yet providing great stability and convenience, this reinforced concrete shaft collar was designed by Roy E. Thomas, chief engineer for Chile Exploration Co., Chuquicamata, Chile. Reinforcing bars are all 5/8-in. square, except those used in the brackets and concrete ring near the bottom of the concrete section which are 7/8-in. square.

A 1:2:4 concrete mix was used. Back forms were used for the upper section of the shaft collar as shown, but the lower section was poured without the use of the back form. Reinforced concrete brackets near the top of the lower concrete ring were constructed to support shaft timbers. Vertical reinforcing rods were seated in a wood frame.

Steel Hard to Get?

Demand Still Exceeds Supply But . . .

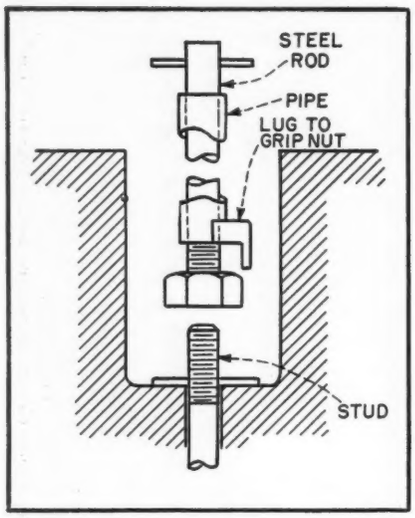
. . . this is a typical view of night loading operations at a Ryerson steel-service plant. The steels specified on several orders are on their way to a loading platform for delivery the following morning. Possibly none of these orders are completely filled—however, the fact remains, we are doing our very best to serve a large group of steel users.

Unfortunately, it often seems that the particular steel *you* want is never on hand, and it is true that we are always short of some kinds and sizes. But our stocks turn over fast. A size that is out today may be in tomorrow. And in spite of current conditions, we still believe the over-all stocks at our thirteen plants are the nation's largest.

Carbon and alloy steels, hot rolled or cold finished, and stainless steel in practically every analysis and finish are in stock, ready for your call. So do not hesitate to get in touch with us —on any requirement. You'll find that every Ryerson steel man will do everything possible to help you get the steel you need, when you need it.

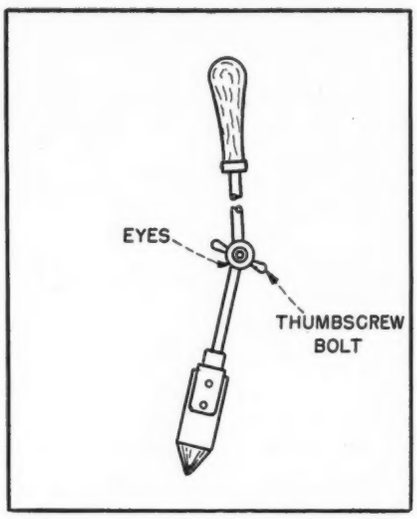
Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

RYERSON STEEL



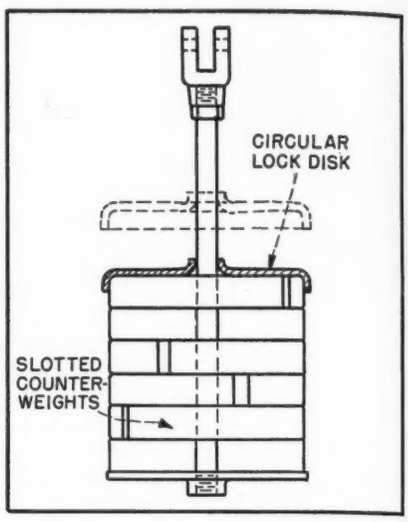
Tool Starts Nuts In Inaccessible Places

Nuts may be started as shown above by attaching them to a steel rod threaded at one end. Then the nut is engaged on the thread of the stud a few turns, after which the short length of pipe with welded-on lug is lowered so that the lug engages the nut. After the nut has been started on the stud, the steel rod is disengaged by reversing rotation while the lug prevents rotation of the nut. Then the nut can be drawn up with a conventional socket wrench.



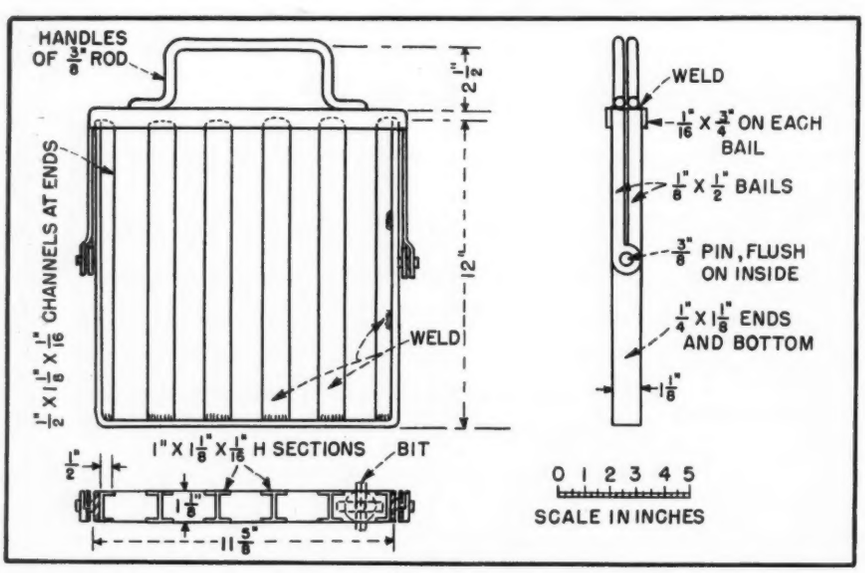
Adjustable Soldering Iron

Mine mechanics and electricians at times are confronted with the task of soldering objects in an out-of-the-way place where a conventional soldering iron would prove to be unhandy. When such work is to be performed, the soldering iron shown in this sketch will be found useful. It is provided with eyes and a thumb-screw bolt and nut in the center of the rod. Thus equipped, the iron can be adjusted to any desired angle, or held in the normal straightway position.



Locking Counterweights On Control Apparatus

Pressure regulators and other control mechanisms used in mills, smelters and power plants which have a number of slotted weights hanging from the end of a beam constitute somewhat of a hazard, especially where the weights are overhead and operators pass beneath them. This hazard was eliminated at a Mexican mining property by locking the top weight in position with a disk as shown above. This safeguard is advisable for pulsating regulators.



A Light-Weight Bit Rack

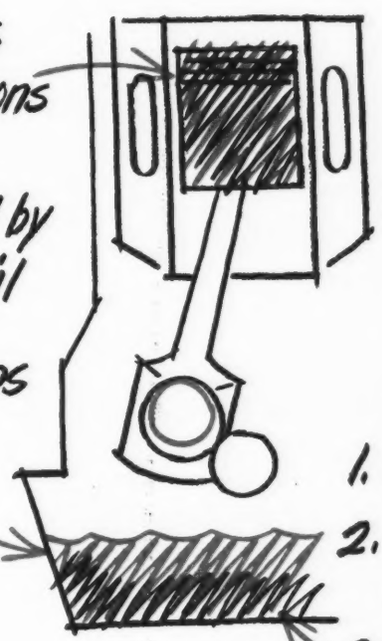
A handy rock drill auxiliary and one that has given excellent service at the Iron Mountain property of Mountain Copper Company, Ltd., Matheson, Shasta County, Calif., is the detachable drill bit rack explained in detail in the accompanying illustrations. It was designed by members of the engineering staff, and its chief features are light-weight construction, large holding capacity, and a novel and positive lock mechanism. The rack is made up of four 1x1-1/8x1/16-in. H-sections and two 1/2x1/8x1/16-in., channel sections, all welded to a U-frame made from 1/4x1/8-in. strap iron, and the hinged lock assembly with two welded-on handles made from 3/8-in. round steel, as shown. Additional weight can be saved if aluminum H, channel and round bars are used in place of steel. The two hinged members of the lock assembly when turned down will hold the rack body in an upright position and prevent spillage of bits. Loading of the rack with bits is simple. Each bit is slid into the space between the H-sections, and when all sections have been loaded the two hinged bails are raised until the two handles meet, and the rack is ready to be taken underground or to the surface by the driller. Each rack contains sufficient bits to drill a complete crosscut, drift, or tunnel round.

LUBE MEMO

Crankcase Sludge causes Hot Lube Oil troubles

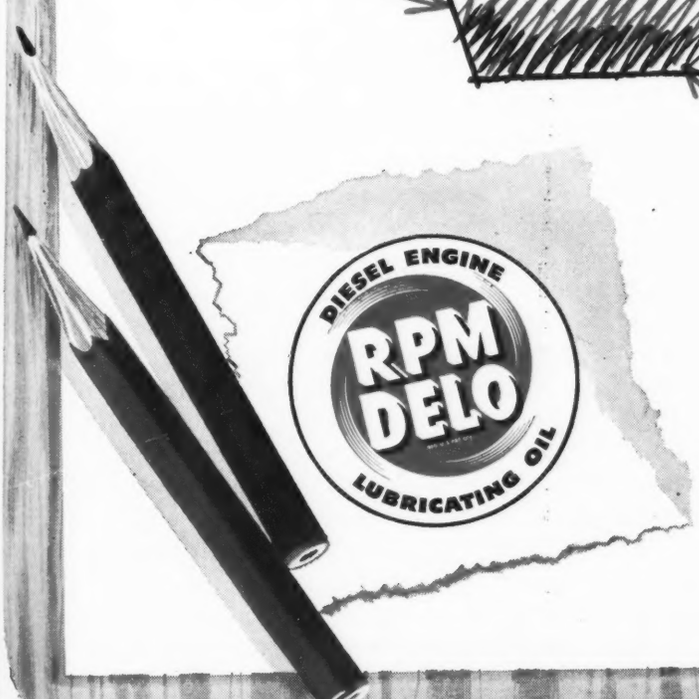
Hot oil oxidizes fast, gums pistons

Sludge formed by ordinary lube oil insulates crankcase, keeps oil hot



Foreman says try RPM DELO Diesel Engine Lubricating Oil – its compounds stop sludging 3 ways:

1. Oil oxidation slowed up
2. Gum and lacquer cleared out.
3. Contaminants held in suspension – flushed out when oil is changed.



Tell foreman OK to order RPM DELO Oil

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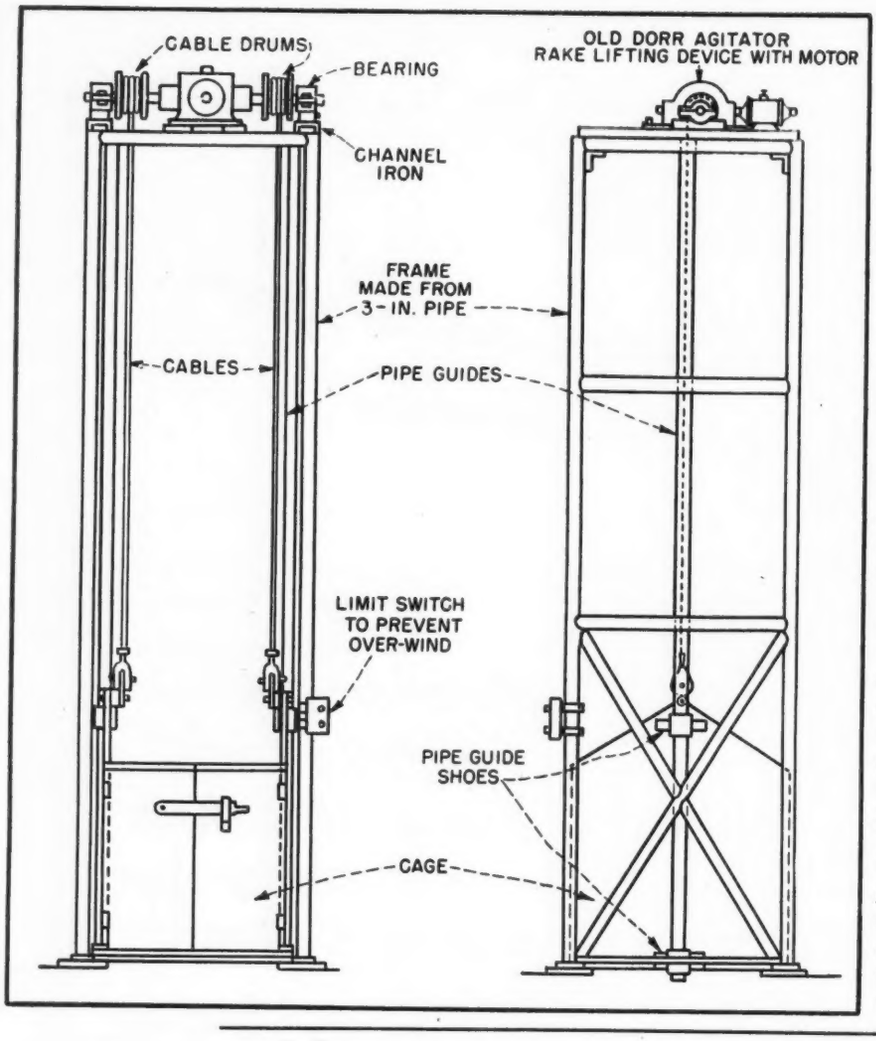
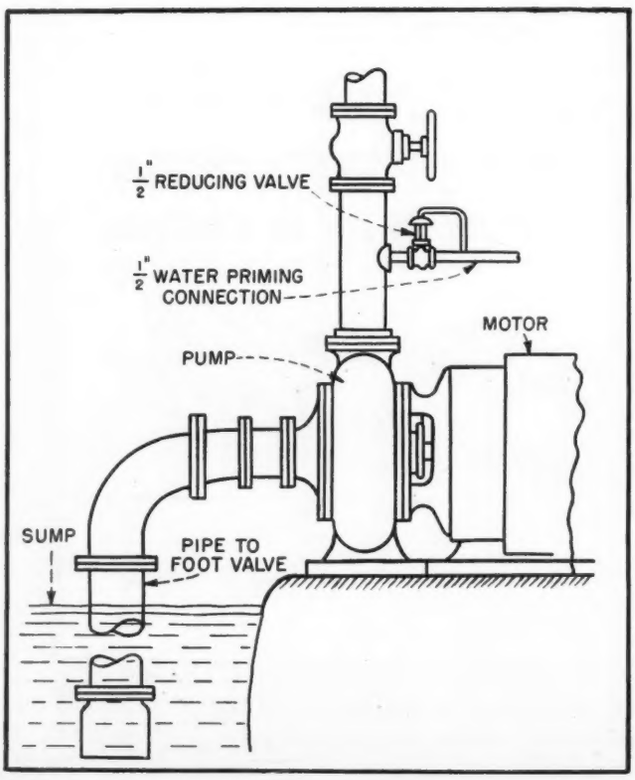
THE CALIFORNIA OIL COMPANY • New York
STANDARD OF TEXAS • El Paso, Texas



Mill Elevator Moves Reagents

Prior to the installation of the small elevator shown in the accompanying sketch, soda ash required in the flotation circuit was pumped to the conditioner tank on the elevated flotation floor of the 400-ton concentrator of Nevada-Massachusetts Co., Tungsten, Nevada, by means of a special pump situated on the ground floor of the concentrator building. Clogging of the pump, caused chiefly by hard water obtained from wells near the plant, frequently interrupted the supply of the reagent mentioned and necessitated transportation by hand to avoid trouble in the flotation circuit. The elevator now used in place of the pump was designed and installed by Louis Ley, mechanic, and consists of a steel frame made from 3-in. pipe; two pipe guides; cage with four pipe shoes; and the lifting mechanism, an old motor-driven Dorr agitator rake lifting device. The cage is controlled by two limit switches, one on the ground floor and the other on the flotation floor, to prevent overwind. Most of the material used in the construction of the elevator came from the scrap pile.

Keeping an Automatic-Operated Pump Primed



The single-stage centrifugal pump shown here was installed on the lowest level in a gold-silver mine in central Mexico to pump water collecting periodically in the shaft sump to the central pump station two levels above. Operation is automatic, starting and stopping of the pump being controlled by a float switch installed in the sump. Water handled by the pump at many periods is muddy, and as a consequence a slimy deposit is built up inside the foot valve, keeping it from seating drop-tight after a pump shutdown. The resultant leak through the foot valve causes a loss of prime. To avoid this and insure proper starting of the pump, the mine mechanic installed the reducing valve in the discharge pipe of the pump. The reducing valve in the ½-in. fresh water line is set to let water flow into the pump if discharge pressure drops below the static discharge head on the pump, replacing the water lost by leakage through the foot valve. When the pump is in operation the pressure in the discharge line is above the reducing-valve setting, and the valve remains closed. During shutdowns, the amount of fresh water flowing through the reducing valve is 1½ gal. per hour.

CANADIAN INSTITUTE *(cont.)*

tite mixed with gravel, with resultant oxidization and cementing, have proved most satisfactory.

Measures for preventing corrosion of hoisting rope and the results of extensive research by manufacturers, mine operators, and engineers, were outlined in a paper, "Hoisting Rope Research in Ontario," prepared by the special committee appointed for this study by the Ontario Mining Association, including R. E. Dye, R. L. Healy, and R. D. Parker.

Reduction Metallurgy

In their paper, "A Method for Adapting the Ammonia Leaching Process to the Recovery of Copper and Nickel from Sulphide Ore and Concentrate," Prof. F. A. Forward, C. S. Samis, and V. Kudryk outlined a comparatively simple and economic process based on roasting for sulphur elimination, followed by ammonia leaching and separation of the copper and nickel for individual recovery. This may prove advantageous in the beneficiation of the Lynn Lake nickel-copper deposits.

J. T. N. Atkinson and Dr. L. M. Pidgeon described the production of calcium by Dominion Magnesium, Ltd., in a paper entitled "Determination of Calcium Vapor Pressure in the Thermal Production of Calcium."

Other Sessions

At the second session on geology several papers were presented dealing with the application of geophysical methods in the search for oil in Canada.

The president-elect, R. W. Diamond, in an address at the third general session, convened under the co-chairmanship of past presidents E. A. Collins of Sudbury, Ont., and George C. Bateman of Montreal, traced the growth and achievements of the Canadian mining industry. He said that, with care that we are not led astray by foolish optimism, there is hope that mining may become an even greater stabilizing force in the national economy of Canada than it has been in the past. Its most important aspect is that of human relationships. This session also heard a paper by the International Nickel staff on improved methods of treating copper-nickel ores.

At a joint metallurgical session, P. E. Cavanaugh, metallurgist for the Ontario Research Foundation, offered a possible solution to Canadian dependence on outside sources for iron production in his presentation of "Economics of Ferrous Smelting in Canada." With adequate supplies of good grade iron ore from Steep Rock and Labrador, and with abundant electric power, he recommended careful investigation of electric furnace production of iron in Canada.

The program was supplemented by special excursions to such points of interest as the Powell River Co. and Britannia Mining and Smelting Co. on Howe Sound; the Bridge River valley, Bralorne and Pioneer gold mines; Granby Consolidated's Copper Mountain operations; Princeton coal fields; Hedley Mascot and Kelowna Exploration Co. gold Mines.

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- Riveting
- Steel Drilling
- Wood Boring
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- Cleaning Boiler Flues
- Cleaning Engine Generators
- Operating Air Hoists

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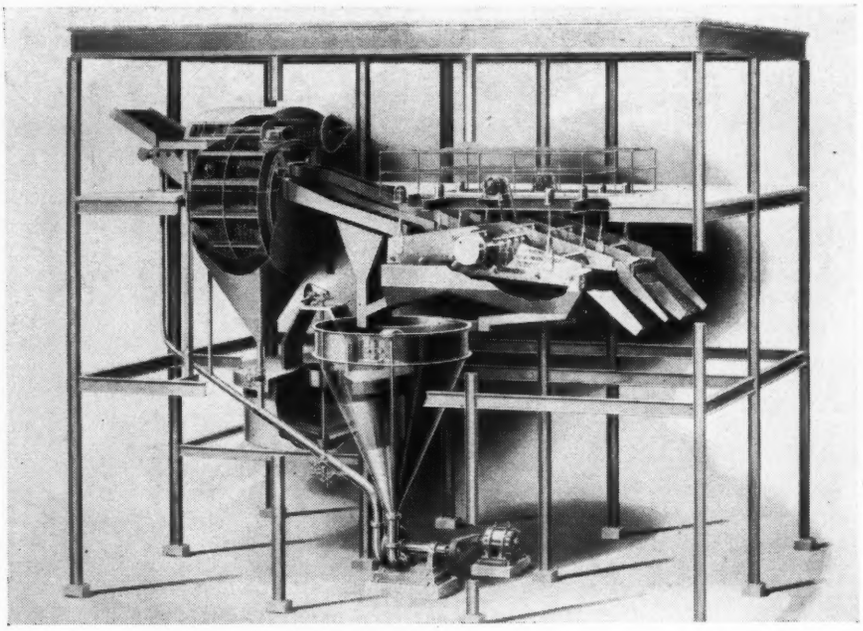
EQUIPMENT NEWS



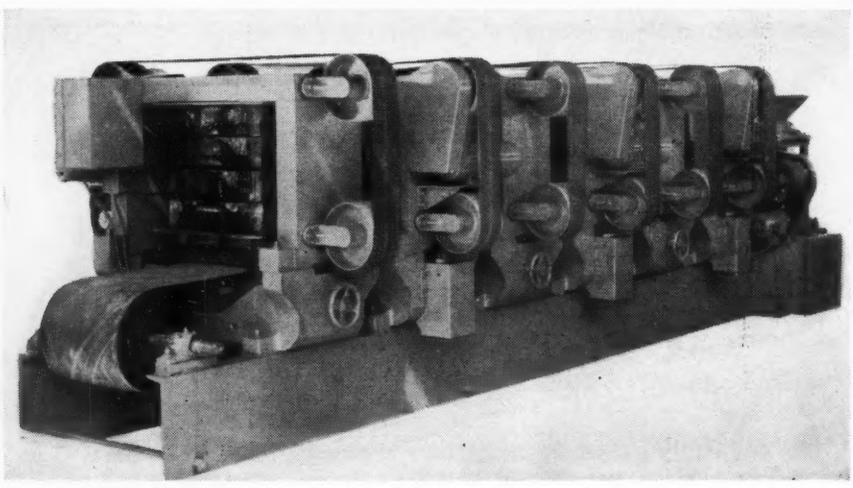
New Machine for Sink and Float Work

After having thoroughly tested and proved the device in actual service, Link-Belt Co. announces a new type of concentrator to use the Heavy-Media method of separating ore minerals and coal from waste rock. The machine is now being installed in several coal cleaning plants, but it is equally adaptable to concentration of other non-metallic or metallic ores.

Shown in the accompanying photograph, the Link-Belt mineral concentrator consists essentially of a drum-shaped tank to hold the liquid medium, and a rotating elevator with perforated lifter shelves that remove the sink product.

Referring to the photograph, the feed enters at the upper left, and drops into the bath of medium. The float product passes across the medium surface and discharges over a weir followed by a stationary sieve. The sink product is picked up by the rotating wheel, medium drains from it on the perforated shelves, and it drops into a flume leading to a vibrating screen. Other details of the process follow regular Heavy-Media procedure.

Among advantages cited for the new machine, the manufacturers mention: low operating and maintenance costs, relatively small capital outlay, ease of operation, capability of making sharp separations at low specific gravities. For full details, write for Bulletin 2101 to Link-Belt Co., Chicago, Ill.



High-Intensity Cross-Belt Magnetic Separator

Super-high intensity and a high degree of selectivity have been built into the new cross-belt Type E magnetic separator shown above, according to its manufacturer, Dings Magnetic Separator Co., Milwaukee, Wis. Materials separated by the new unit include: ilmenite, monazite, chromite, garnet, epidote, wolframite, and pyrrhotite, some of which have never before been separated magnetically.

The machine is available with any number of cross belts, and an eight-belt machine, for example, could produce eight different products and a non-magnetic tailing. This would be accomplished by varying the strength of each cross-belt magnet to extract materials of different magnetic susceptibilities.

A high degree of selectivity is obtained in the new separator by these three control elements: 1, extremely high-intensity magnetic pole (patent applied for); 2, hand-wheel adjustment of air gap; 3, variable speed drive on main conveyor belt.

Most important new feature is the construction of the pole noses on each cross belt unit, which is said to result in a separating capacity twice as great as older models. A highly efficient closed magnetic circuit is used. This is reported as the first new development of a high-intensity commercial separator in several years, and it is now in use obtaining minerals for atomic energy purposes.

Enclosed, Cooled Motors

A number of improvements were announced recently by Allis-Chalmers Mfg. Co., Milwaukee, Wis., in their line of totally enclosed, fan-cooled, wound-rotor motors. Use of an improved tube-type air-to-air heat exchanger makes it possible to build smaller motors with the same power as older designs.

To suit the most difficult conditions, the motors can be built with stainless steel ventilating tubes, fans, and end plates. Because of the design's simplicity, cleaning is seldom required.

Combustion Safeguard

The explosion hazard ever-present in oil-burning equipment arising out of flame failure can be guarded against by the new photoelectric scanner, Type 45PH5, recently announced by Combustion Control Corporation, 3 Chestnut St., Cambridge, Mass. The unit consists of a phototube and an amplifier that are mounted on the oil burner to command a view of the flame. In the event of flame failure, the unit immediately shuts off the fuel supply.

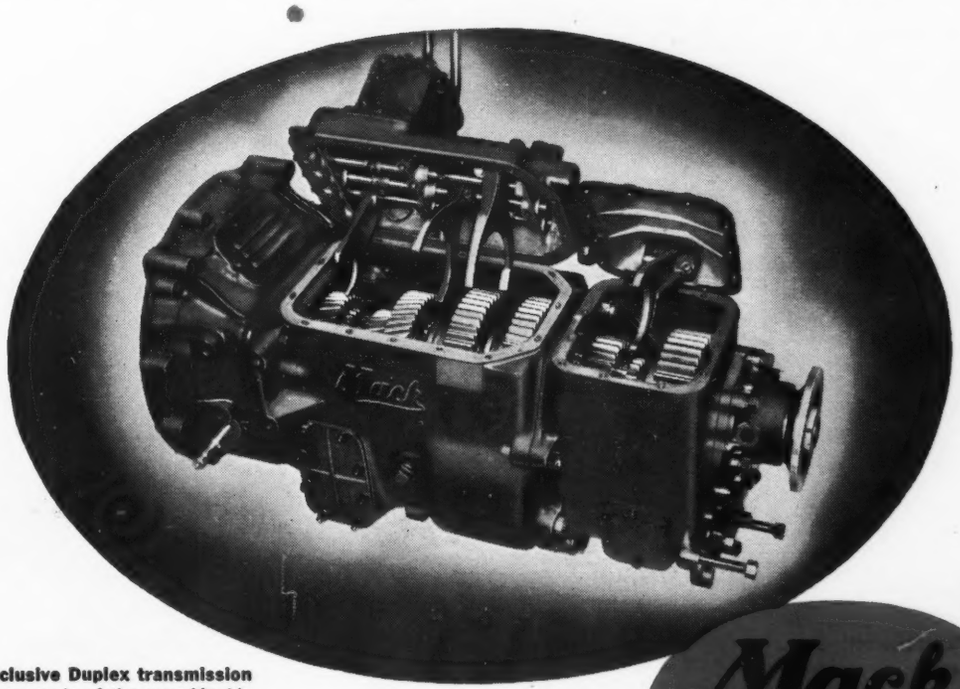
Hard-Surfacing Electrodes

Four new hard-surfacing electrodes have been announced by Welding Division, Harnischfeger Corporation, 4400 West National Ave., Milwaukee 14, Wis. They are identified by the name, Hartop, and by a distinguishing color: brown, green, red, and yellow, given in order of increasing hardness. Hardness of deposited metal

you get more work out of Mack Trucks

Work done on the job is the one true yardstick of truck value. In coal stripping and open-pit mining, experience has proved to profit-wise operators that Mack trucks give full measure — and more — in extra tonnage per work-hour, enduring reliability and rock-bottom maintenance costs.

because . . . we put more work into Macks



Mack's exclusive Duplex transmission is another example of the way Mack's better design pays off in better performance — on the job. Engineered as a single unit, the Mack Duplex gives eight forward speeds with easy even intervals between speeds. Closer steps result in higher average speed, easier shifting, better acceleration, improved fuel economy and less maintenance.

Mack
trucks for every purpose

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK

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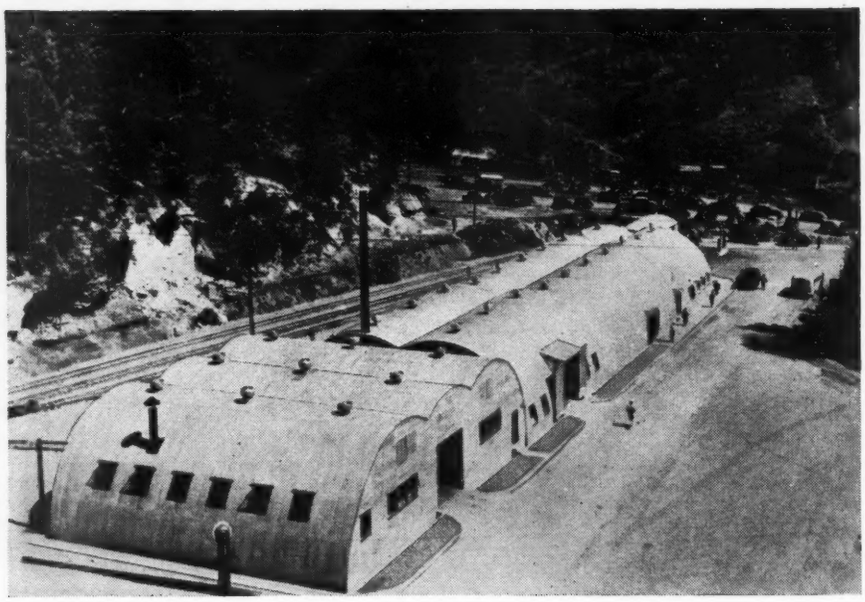
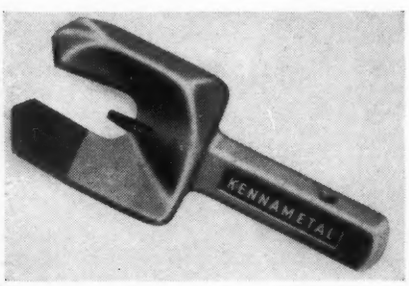


Quonsets Can Save Money For Mine Camps

The multiple-arch Quonset steel building has proved to be much cheaper to erect, and perfectly satisfactory to use, on the property of at least one mining company. According to George Keat, construction engineer for Consolidation Coal Co. of Kentucky, subsidiary of Pittsburgh Consolidation Coal Co., a total saving of 20% is possible in purchase and erection costs of Quonsets as compared with equivalent costs for any conventional structure. The over-all cost for the Quonsets came to $3.29 per sq. ft. of floor space, against $4.10 for the conventional type.

The photograph shows the administration building, the change house, and the shop at Consolidation's Mine 204 near Jenkins, Ky. For more details on Quonsets, write StranSteel Division, Great Lakes Steel Corporation, Detroit, Mich.

runs from 35 Rockwell C for the brown, to 63 Rockwell C for the yellow. Each type has certain special properties in resistance to shock and abrasion



Rotary Drill Bit

Designed for use in non-metallic mining operations, such as for clay, limestone, stone, and slate, a new rotary drill has been announced by Kennametal, Inc., Latrobe, Pa. Using Kennametal (cemented carbide) inserts for bit prongs and for the core-breaker, the new drill is said to give increased speed of drilling and longer life than conventional bits. The company also announces development of a new 9-in. diameter rotary drill bit for drilling overburden in coal strip mines.

For Welding Cast Iron

Two new Flexarc electrodes for d.c. or a.c. welding of cast iron were announced recently by Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. One, using a mild steel core, produces a hard deposit that is not machinable. The other, with a pure nickel core, makes a soft and readily machinable deposit.

Open Gear Lubricant

A new all-weather open-gear lubricant that is stable at both high and low temperatures has been perfected by D-A Lubricant Co., Indianapolis, Ind. Designed for use with construction, mining, and logging equipment, the lubricant can be applied without being heated, and it will not solidify at temperatures below zero or lose its body at extremely high temperatures.

High-Visibility for Cable

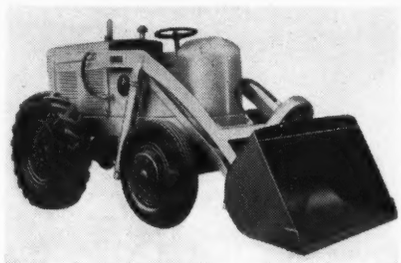
Yellow electrical cable that can easily be seen in the darkness of a mine has been developed by United States Rubber Co., Rockefeller Center, New York, N. Y. The cable will be made in various sizes for use with cutters, loaders, drills, locomotives, and other equipment. The yellow jacket will help miners to see the cable more easily and keep it out of danger.

Balanced Sheave Block

Designed especially to meet the exacting requirements of mining operators, the new Ropemaster sheave block is available in all sizes for underground and surface mining applications, according to its manufacturers, Cate Equipment Co., Salt Lake City, Utah. The new block is built of manganese steel. Its features include: streamlined sides, precision-built Timken bearing assembly, positive grease seal, and strut-reinforced ear lugs.

Private Hydro-Electricity

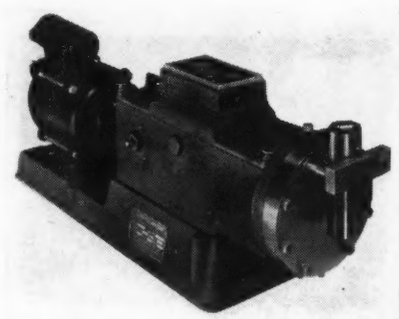
Water heads of from 20 to 150 ft. may be used to generate from 5 to 67 hp. of a.c. electric current at standard voltage, by means of the Triad turbine hydroelectric generator, manufactured by Northwest Machine Works, Portland, Ore. Three designs of runners are available. The voltage regulator, with meters, is mounted on the generator, and speed regulation is through adjustment dials built into the unit.



Improved Small Shovel

Previously equipped with hydraulic lift and lowering of the bucket, the Hough ¾-cu. yd. Payloader shovel now has the added feature of hydraulic bucket control, which pumps and closes the bucket by fingertip-actuated hydraulic power.

The new bucket control speeds up operation of the shovel, and also greatly lessens shock and wear on the shovel mechanism. For full details, write to Frank G. Hough Co., 801-W Sunnyside Ave., Libertyville, Ill.



For Feeding Chemicals

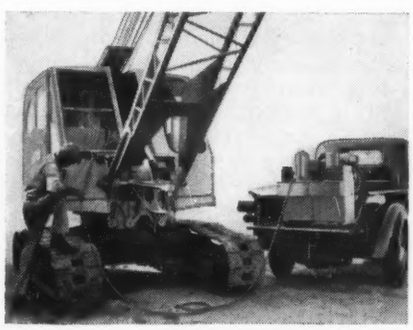
A new series of accurately-controlled pumps for feeding liquid reagents has been announced by Lapp Insulator Co., Inc., Le Roy, N. Y. Called the Pulsafeeder proportioning pump, the unit offers a new design that is said to provide greater capacity, higher pressure operation, and rugged assembly. The pump is suited to a wide range of applications in laboratory,

pilot plant, and other industrial processing.

A piston in the new pump operates over a measured stroke, and thereby displaces oil, which in turn pulsates a diaphragm. Displacement of the diaphragm controls the flow of the reagent being fed. The chemical is thus completely isolated from the pumping mechanism, and no stuffing box is needed. The pump comes in four sizes covering a range in flow from zero up to 330 g.p.h. Write for Bulletin 262.

Improved Keyway Kit

The du Mont Corporation, Greenfield, Mass., announces an addition to their line of "Minute Man" keyway broach kits for cutting all standard keyway sizes. The new kits are available with carbon steel broaches and with high speed steel broaches. Bushings are provided for all hole sizes from 12-in. to 1 9/16-in. Using the kits, keyways can be cut in any gear, milling cutter, pulley hub, collar, or similar part in a minute's time.



On-The-Spot Lubrication

A mobile lubrication depot for heavy machinery, which is complete, compact, and self-powered, has been developed by Gray Co., Industrial Division, Graco Square, Minneapolis 13, Minn.

Called the Trail-Luber, the unit includes: a two-compartment hopper for pressure lube and gear lube; two air-operated pumps; two 20-ft. lubricant hoses; one 25-ft. air line hose; a Briggs & Stratton 1¾-hp. engine; and an air compressor that delivers 7 c.f.m. Both skid-mounted and trailer-mounted models are available.

Conveyors Easily Ordered

Pioneer Engineering Works, Minneapolis 13, Minn., announces a new plan that enables a customer to buy a complete belt conveyor installation by specifying only: 1, type and amount of material to be handled; 2, the distance and height to be covered. Conveyors have been pre-engineered by the company to fit nearly every requirement. The service is now available on conveyors using belt widths of 18 in., 24 in., and 30 in. Conveyor lengths run from 30 ft. to 120 ft. in 5-ft. increments. The service is described in a new bulletin available on request to the company.

INDUSTRIAL NOTES

HARLOWE HARDINGE, president of the Hardinge Co., York, Pa., has been elected a director of the Pennsylvania State Chamber of Commerce for a two-year term.

C. H. RIEMAN, of the San Francisco office of GARDNER-DENVER CO., has been appointed to succeed the late C. L. KOHLHAAS as manager of the Duluth office of the company.

A. J. GRAFF, of LAKE SHORE ENGINEERING CO., Marquette, Mich., manufacturers of mining equipment, has been promoted from general manager to vice president in charge of manufacturing.

LINDE AIR PRODUCTS CO. plans to construct an oxygen filling station and acetylene plant at Billings, Mont.

KENNETH N. COOK, assistant sales manager of ROLLWAY BEARING CO., INC., Syracuse, N. Y., passed away suddenly on March 5, 1948. He had been with the Rollway Bearing Co. since 1927.

KENNAMETAL INC., Latrobe, Pa., announces that M. F. BOTTOMLEE has been appointed as sales engineer for the Rocky Mountain area.

HARDINGE CO., York, Pa., announces the recent appointment of FRED STUART, of STUART CORPORATION, Baltimore, Md., as sales agent for Hardinge products in the southeastern states.

HAROLD N. PROPP, sales engineer for NORDBERG MANUFACTURING CO.'s crusher division, has been transferred from the Milwaukee office to the San Francisco office of the company.

J. F. HENSGEN, of St. Louis, has been appointed special mining representative for the Midwest section of UNITED STATES RUBBER CO.

BULLETINS

FLEXIBLE COUPLINGS. The question of how flexible couplings can help avoid bearing wear, or bearing and shaft failures, is taken up in a new booklet, "Relief From Bearing Wear Grief," recently published by Dept. C-1, American Flexible Coupling Co., Erie, Pa.

VERSATILE SHOVEL. Bulletin 64-A, Lima-Hamilton Corporation, Lima, Ohio, contains details on the company's new Lima type 604 combination shovel, crane, dragline. Featuring precision air control, the unit can be a 1½-yd. shovel, a 30-ton crane, or a dragline of variable capacity.

HEAVY-DUTY TRACTOR. The big

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Your investment in anti-friction bearings is certainly great enough to warrant your investigating the possible savings to be made through the use of LUBRIPLATE lubricants. They actually preserve bearing surfaces, arrest progressive wear and protect against rust and corrosion. There are LUBRIPLATE lubricants for all speeds, all operating temperatures and conditions. Write for particulars.

Rx FOR YOUR MACHINERY

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No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107 — One of the most popular grease type products for general application by pressure gun or cups.

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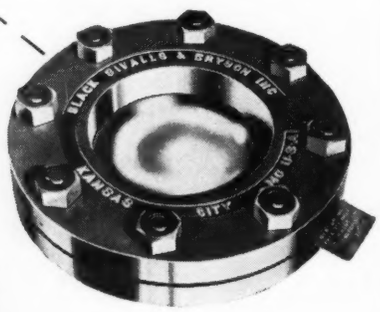

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new TD-24, 180-hp. crawler tractor, recently announced by International Harvester Co., is described in a heavily-illustrated booklet, Form No. A-34-LL, available from the company at 180 North Michigan Ave., Chicago 1, Ill. Sectional views, line drawings, and photographs are used to show the various parts of the tractor in action.

ROD MILLS. Construction of rod mills, and the advantages of using them in certain applications, are explained in a new 12-page booklet released by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

POWDER BAGS. Advantages of using powder bags for mine blasting are discussed in booklet MVP, issued by American Brattice Cloth Corporation, Warsaw, Ind., makers of MineVent powder bags.

STEEL CHAIN. Manganese steel chain in various heavy industries forms the subject of Bulletin 742-CN, recently published by American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.

MINE TRUCKS. "Mack in the Mines and the Quarries" is the title of a new 16-page booklet prepared by Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y., to show how Mack trucks are used in these two fields.

MINE CONVEYORS. Robins Conveyors Division, Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J., has issued a new bulletin, No. 127-A, on mine conveyors. Each element of conveyors for underground use is described.

LOW TEMPERATURE ALLOYS. Cerro de Pasco Copper Corporation, Dept. B-5, 40 Wall St., New York 5, N. Y., recently published the first few sheets of a series containing information on the applications of the company's low-temperature melting alloys.

COAL FIRING. "Saving the Fuel Dollar" is the title of a new booklet issued by Engineering Research Division, Ohio Coal Association, Rockefeller Building, Cleveland 13, Ohio. Aim of the booklet is to help steam plant operators achieve lower fuel costs.

ENCLOSED MOTORS. Totally enclosed, fan-cooled motors in sizes between 250 and 500-hp., suitable for driving high-speed blowers, pumps, compressors, and like equipment, are described in a new bulletin of Burke Electric Co., 273 West 12th. St., Erie, Pa.

VENTILATION TUBING. The several varieties of flexible tubing for mine ventilation made by American Ventilating Hose Co., 15 Park Row, New York 7, N. Y., are described in new bulletins recently issued by the company. Data and suggestions for proper use are included.

USE OF CYLINDERS. Use of actuating cylinders employing oil, air, or water for a number of applications is described in Bulletin No. 481, published by Engineering Products Co., 1600 S. San Pedro, Los Angeles 15, Calif.

BELTS. New catalog sections on the company's line of elevator and conveyor belts have been published by B. F. Goodrich Co., Akron, Ohio. Selection and application data are included.

NEW BOOKS

A MANUAL OF ENGINEERING DRAWING. By the late Professor Thomas E. French. Seventh edition revised by Charles J. Vierck, Professor of Engineering Drawing, Ohio State University. Published by McGraw-Hill Book Co., Inc., New York. Pp., 694. Price, $3.75.

As in previous editions, this book keeps abreast of modern engineering practice by eliminating the obsolete, and adding new material in text and problems.

A new chapter on illustration is unique, in that the student is shown how to use drafting techniques to present objects artistically and clearly for the benefit of those unskilled in reading blueprints, or for such special purposes as patent applications. The chapter covers shade lines, line shading, continuous-tone shading, smudge shading, brush-stipple shading, and drawings for reproduction in magazines, books, and catalogs.

Instructors who have long contended with the difficulty of "getting students to see" certain phases of drawing, such as orthographic projection, will appreciate the McGraw-Hill Text Films which are available to complement classroom lectures. The following films and film strips have been prepared: "Introduction to Engineering Drawing," "Orthographic Projection," "Auxiliary Views," "Sections and Conventions," "The Drawing and the Shop," and "Dimensioning Techniques."

MAGNETIC SURVEY OF SOUTHEASTERN CRAWFORD COUNTY, KANSAS. By Robert M. Dreyer. Published as Bulletin 70, Part 5, of State Geological Survey of Kansas, University of Kansas, Lawrence, Kan.

This report is of particular interest at present because of the growing urgency of conducting just such explorations over wide areas where there is little or no surface indication of the presence of desired minerals. The aim of the author was to develop a technique whereby large areas could be explored for a northward extension of the Tri-State zinc-lead orebodies. The particular results obtained in this work, good as they were, are really of less importance than the general philosophy of the work as a whole. There will be, and there should be, more of this sort of thing.

SEVENTY-FIVE YEARS OF PROGRESS IN THE MINERAL INDUSTRY. Edited by A. B. Parsons. Published by American Institute of Mining and Metallurgical Engineers, 29 West 39th. St., New York, N. Y. Pp., 817. Price, $6.

To signalize the 75th anniversary of the founding of the A.I.M.E., the Institute has compiled this volume of combined reminiscence and forecast. Technical progress over the past 75 years is reviewed by a dozen outstanding authorities, and the several papers presented in New York last March as part of a conference on world mineral resources are printed in their entiretv. A history of the Institute is contributed by its present secretary, A. B. Parsons. As a condensed record of the technical growth of the mining industry in the last 75 years, this volume clearly is beyond compare.

MINERAL RESOURCES OF COLORADO. Prepared under the supervision of John W. Vanderwilt, consulting geologist, for the Colorado Mineral Resources Board. Copies may be obtained from the Colorado Mining Association, Denver 2, Colo. Pp., 547. Price, $2.50.

The Colorado State Mineral Resources Board has performed an excellent and useful service in sponsoring this concise and complete reference book which is presented under the following sub-titles: Part I. Metals, Nonmetals, and Fuels, by John W. Vanderwilt. Part II. Summaries of Mining Districts and Mineral Deposits, prepared by the U. S. Geologic Survey under the special supervision of W. S. Burbank. Part III. Investigation of Strategic Mineral Resources, by W. M. Traver, Jr., U. S. Bureau of Mines.

A list of mining districts with page references to "Mineral Resources" and the "Minerals Yearbook" is prepared in convenient chart form for the years 1882 to 1944 for readers who want to make an exhaustive study of any mining district.

The text is supplemented with 44 sketches, sections, production charts, geologic maps, and index maps showing the distribution of metals, non-metals, fuels, and power distribution systems. A complete index of 51 pages concludes the volume and enhances its usefulness for reference purposes.

CENTRIFUGAL AND AXIAL FLOW PUMPS. By A. J. Stepanoff. John Wiley & Sons, Inc., New York 16, N. Y. Price, $7.50.

Written as a working manual for consulting engineers and plant designers, this book takes up, according to its publishers, a theoretical treatment of the centrifugal pump impeller that deviates radically from that of other works on this subject. The flow through the impeller is resolved into a meridianal flow, caused by the energy gradient drop and a circular motion, which may assume one of the many possible forms of vortex motion. The single pattern of flow thus arrived at (and its resultant similar geometric procedure for straight centrifugal, mixed flow, and straight axial flow pumps) makes it easier to deal with a number of formerly controversial issues. The book was written by Dr. A. J. Stepanoff, development engineer for the Ingersoll-Rand Co., a man who is in a position to know whereof he speaks.

JET-PROPULSION PROGRESS. By Leslie E. Neville and N. F. Silsbee. McGraw-Hill Book Co., New York. Pp. 232. Price, $3.50

The tremendous speeds developed by jet-propelled aircraft lend a fascination to the subject which is not dispelled by the rather technical discussion of Messrs. Neville and Silsbee. The layman should find the book an aid to a better understanding of what he reads in the daily news about developments in this section of aviation. Interest is added when the authors point out that the Germans were first in the field and that the course of the war might have been quite different had they pressed their program for jet-propelled machines a bit more strongly. The fact that the gas turbine has possibilities also for driving ocean vessels, helicopters, locomotives and automobiles or as an auxiliary power plant for producing light, heat and refrigeration should increase the reader's interest.

ELEMENTS OF NOMOGRAPHY. By Raymond D. Douglass and Douglas P. Adams. Published by the McGraw-Hill Book Co., New York. Pp., 209. Price, $3.50.

Although alignment charts (nomographs) are used by many engineers, only a limited number know how to make them. In this text the authors present an orderly approach to the problem of translating practical mathematical formulas into nomographs. Seven elementary types of alignment charts are discussed. Variations of these types will enable the reader to prepare charts based on mathematical formulas which govern many practical problems in mining, milling, and smelting. The "circular nomogram" is featured in the test, showing how to use this new device to solve trigometric and power functions.

MINING CATALOGS—CORRECTION

The 1947-1948 edition of the MINING CATALOGS published by McGraw-Hill Catalog Service has been distributed. Containing nearly 500 pages of manufacturers' catalog information, this is the most comprehensive edition ever published.

The publishers wish to point out two errors. The Sink & Float Corporation's page number is wrong in the product index, the correct page being A-253, and not B-253 as indicated. On the Page for Nichols Engineering & Research Corporation, page A-145, the cut showing the Nichols Herreshoff multiple hearth furnace is upside down. These errors are sincerely regretted.

(Continued on p. 127)

PERSONAL NEWS

NESTORIO N. LIM, Chief of the Mining and Metallurgical Division of the Philippine Bureau of Mines, has been elected president of the Philippine Society of Mining, Metallurgical, and Geological Engineers for 1948.

EUGENE P. PFLEIDER, formerly mine superintendent for Nicaro Nickel Co. in Cuba, is a member of the faculty of the School of Mines and Metallurgy, University of Minnesota.

The Oliver Iron Mining Co., a U. S. Steel subsidiary, has announced that PHILIP W. CHASE has been named Manager of Special Investigations and Explorations.

CHESTER W. WILSON, mechanical electrical engineer with American Smelting and Refining Co. for 40 years, has retired from that post. He will go to Rosita, Coahuila, Mexico, to supervise the erection of a new steam power plant for Cia. Carbonifera de Sabinas.

ROBERT GRIBBLE is a recent addition to the technical staff of Battelle Institute, where he will do research work in mineral technology.

A pioneer of the Mesabi from 1895 to 1898 and during 1900, OSCAR REINHOLT, is now operating a mine and log-washer in a brown ore belt near Anniston, Alabama.

DAVID H. ACKERMAN, formerly engineer at the Benson iron mine of the Jones & Laughlin Ore Co., New York, has been transferred to the firm's geological staff at Ishpeming, Mich.

JOHN KNOX has resigned as general manager of Hollinger North Shore Exploration Co. and Labrador Mining and Exploration Co., but continues as consulting engineer. W. H. DURRELL succeeds Mr. Knox as general manager.

The new director of health and safety of the Lead Industries Assn. is MANFRED BOWDITCH. He was formerly director of the Division of Occupational Hygiene, Department of Labor and Industries, of the Commonwealth of Massachusetts. Mr. Bowditch also served as field director of the Saranac Laboratory.

FORREST L. BRADFIELD, JR., formerly of the Prince Consolidated Mining Co., is now an engineer for the Surcease Mining Co. in Red Mountain, Calif.

W. G. JEWITT, manager of Consolidated Mining & Smelting Co., has announced the promotion of HENRY GIEGERICH from general superintendent of the North Central District to general superintendent of exploration and outside mines.

LEO BROSSARD, formerly with Koulomzinc, Geoffrey, Brossard & Co., now has his own office at Val d'Or, Quebec. He offers facilities for Askania magnetometer surveys and geological claim surveys, and is also acting as field engineer for the Nemrod Mining Co.

F. F. ESPIE, who is superintendent and director of the Western Mining Corporation, Ltd., and a diretcor of Gold Exploration & Finance Co. of Australia Ltd., and Gold Mines of Kalgoorli, Ltd, has been elected president of the Australian Institute of Mining & Metallurgy.

B. H. McLEOD, formerly with Inspiration Consolidated Copper Co., is chief metallurgist for the Magnet Cove Barium Corp.

The American Institute of Metals has awarded its Platinum Medal to ROBERT CROOKS STANLEY, chairman and president of International Nickel Co., in recognition of his outstanding services to the

R. C. STANLEY

non-ferrous metal industries. A member of the Company and its predecessors since 1901, he contributed largely to the organization's growth and to its reputation as one of the world's most successful mining and metallurgical enterprises.

J. J. BEESON, who was with the Premium Price Plan in Washington, is again a consulting mining engineer and geologist, with headquarters in the Dooly Bldg., Salt Lake City.

EVERETT M. PARIS has left the U. S. Vanadium Corp. in Bishop, California, to work for the New Park Mining Co. in Keetley, Utah.

L. A. NORMAN, JR., has been appointed district mining engineer in the Los Angeles office of the California State Division of Mines. The territory includes 18 counties in Southern California.

R. W. DIAMOND, vice president and general manager of Consolidated Mining and Smelting Co., succeeds DR. CHARLES CAMSELL as president of the Canadian Institute of Mining and Metallurgy.

WILLIAM J. WAYLETT has joined the staff of Anaconda Copper Mining Co. at Butte, Montana.

CYRUS S. NORITAKE, metallurgical engineer, has accepted a position with the U. S. Metals Refining Co. He will work in the metallurgical research department at Carteret, N. J.

H .R. RICE, a graduate of Queen's University (1931), has joined the staff of the Canadian Mining Journal as associate editor. In this capacity he will visit Canadian mines during 1948.

F. M. MURPHY, who resigned as geologist with the Union Pacific Railroad Co., is a consultant in Las Vegas, Nevada.

STANLY A. EASTON, president of Bunker Hill & Sullivan Mining & Concentrating Co., and ROGER H. CUTTING, president of Northwest Lead Co., have announced that WALLACE D. MIRACLE (San Francisco) has been appointed District Sales Manager of Bunker Hill Smelter, Northwest Lead Co., and Sullivan Mining Co. in the States of California, Nevada, Arizona, and New Mexico. Mr. Miracle replaces F. ARTHUR HAMMERSMITH, who retired after 55 years in the lead and mining industries.

The former assistant mine superintendent of the New Park Mining Co., JOHN D. BOENTJE, JR., is a lecturer in mining engineering at the University of Utah.

GILBERT ROBINSON, head of the geology department at Clemson College, and DR. F. H. H. CALHOUN, retired dean of the school of chemistry and geology, will conduct studies of the minerals and clays of Greenwood County, S. C. The survey, sponsored by the Kiwanis Club, is to determine just what minerals are available and whether they occur in sufficient quantities to make extensive mining operations profitable.

D. CARL ABERNATHY is now mining supervisor, Eastern District, Conservation Branch, of the U. S. Geological Survey. He will supervise mining operations under mineral leases on public, Indian, and acquired Government lands in the eastern United States, and will continue to make his headquarters in the Washington offices.

JOHN V. BEALL, former mining engineer and contract miner for the Idaho Maryland Mines Corp., has replaced SHELDON P. WIMPFEN as assistant editor of Mining & Metallurgy.

ROBERT PEPER, C. E., recently graduated from the University of Colorado, is now with Pickands, Maher & Co. at Hibbing, Minnesota.

DR. D. R. GRANTHAM, formerly chief geologist of the Tanganyika Territory, has set up private practice there.

JAMES A. NOBLE is now on the staff of the California Institute of Technology at Pasadena. He was formerly chief geologist of the Homestake Mining Co.

The president of the Sintering Machinery Corp., W. CHURCH HOLMES, has been made manager of the Yukon division of the Sunshine Mining Co.

OBITUARIES

W. J. WILLIAMS, safety engineer since 1922 with the Morenci branch of Phelps Dodge Corporation until he retired February 1 ,died February 6 after a brief illness. He was 65.

One of the first settlers and assayers of Gold field, Nevada, RAYMOND IRVIN GREEN, 78, died March 6 in Salt Lake City. He was an employee of American Smelting & Refining Co. in its ore purchasing and shipping department.

DR. FRANK N. CARRIER died February 5 in Santa Rita, New Mexico, at the age of 75. He was the retired chief surgeon of Chino Mines Division, Kennecott Copper Corporation.

WILLIAM NEIL PAYNE, secretary and treasurer of American Zinc, Lead & Smelting Co., died suddenly at his home in St. Louis, Mo., on March 11. He was 66.

ARTHUR ST. CLAIR DUNDAS, metallurgist and mine operator, died at Bisbee, Arizona, February 20, at the age of 58. At the time of his death, he was mill foreman at the Warren plant of the Phelps Dodge Co.

J. W. FOURR, mine superintendent of the Cananea property until his retirement, died at his home in Douglas, Arizona, in January. He was 72.

GEORGE MARTINSON, 58, who was director of safety for all the Pickands, Mather & Co. interests, died in Cleveland on March 10 after a two-weeks' illness. He had been with the company since 1909.

GORDON McMILLAN, consulting mining engineer for many Utah mining firms, died in Salt Lake City on March 16. He was 64.

An Appreciation of Sibley Byron McCluskey

Sibley Byron McCluskey died in Oakland, California, on February 23, 1948. He was born in San Francisco on October 2, 1886. He started his professional career in 1909 with the firm of Spurr & Cox. From then until 1916 he was engaged in various phases of mining and metallurgical work, shifted from camp to camp getting broad general experience to "find" himself in the industry. From 1916 to 1922 he was associated with Charles Butters in various Central American enterprises as a metallurgist, mill superintendent and manager. From 1922 to 1945 he was senior metallurgical engineer and consultant for the New Consolidated Gold Fields, Ltd., and their numerous subsidiaries and affiliates with headquarters in London. In this capacity his work took him to many parts of Africa, Europe, Mexico, Australia, South America and the United States. It was his practice to make the rounds of his company's various operations. Such trips necessitated his encircling the globe and required from two to three years. During this work he built some of the famous mills of the world

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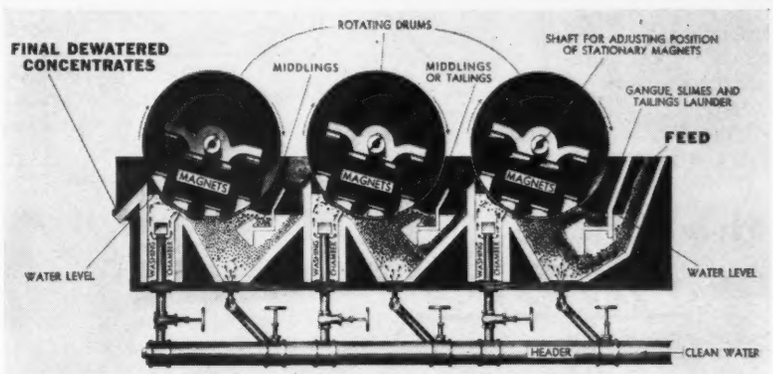

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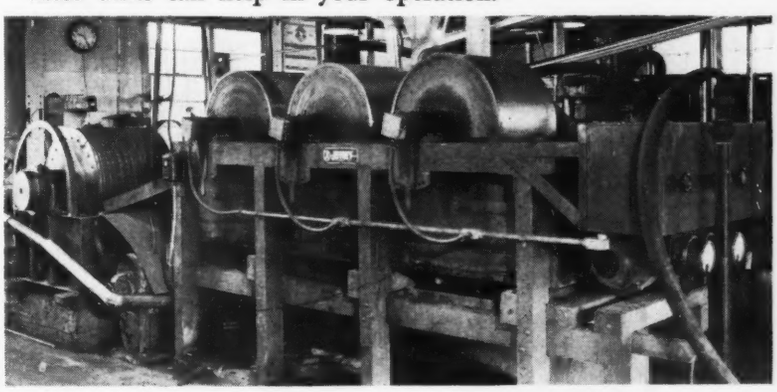

Drawing explains three-drum separator operation—also available in one or two-drum models. Photo shows three-drum separator, followed by filter, operating on magnetic taconite.

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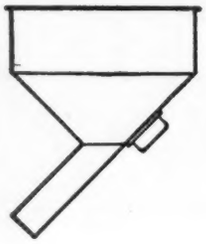
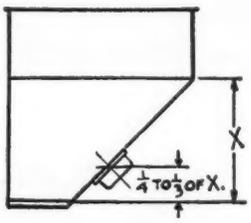


HANDLING STUBBORN MATERIALS?



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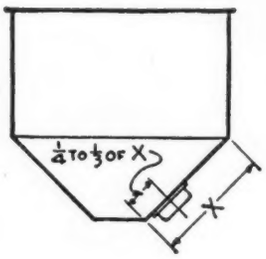

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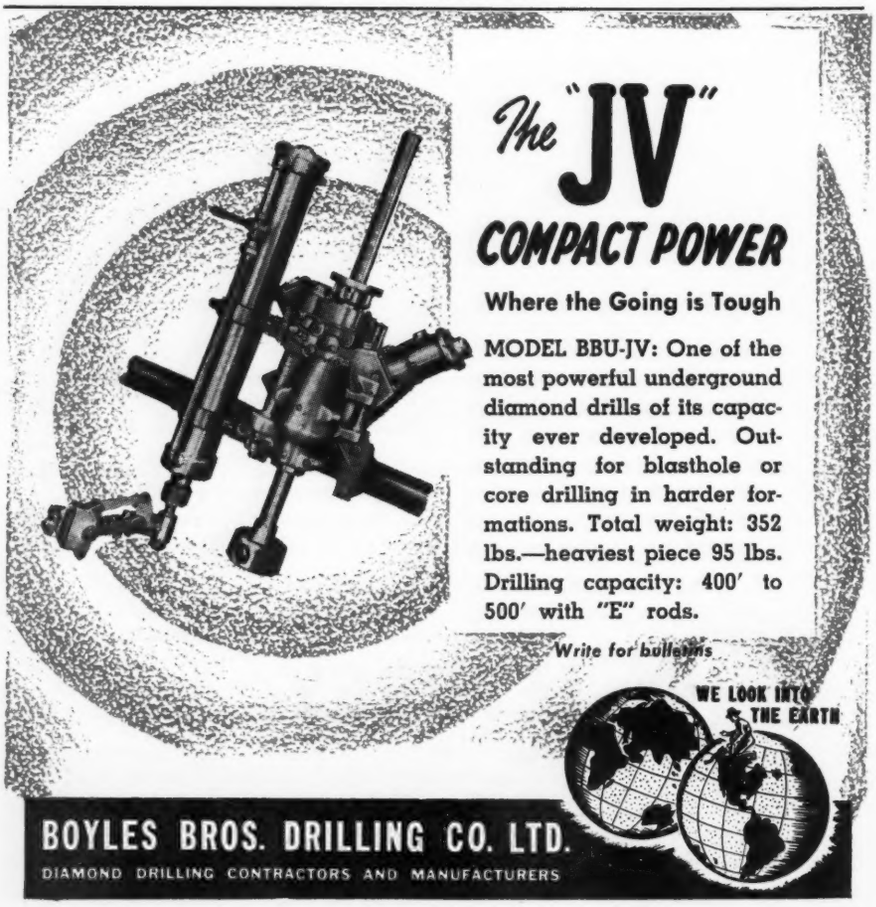

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and instituted many changes in flow sheets and design which greatly increased the efficiency of their operations. He won an outstanding place in the metallurgical world as an expert in cyanidation; yet his work embraced practically every field of ore-dressing. He was a keen student and possessed a remarkably retentative memory, and with his inventive mind he made many contributions to the art of ore-dressing which are too numerous to record here.

From 1945 to his death, he was engaged in consulting work and in the development of some of his recent inventions. In addition to these he was endeavoring to rehabilitate the famous old gold camp of Bodie, California, for large open pit operations.

He was a member of The Institution of Mining and Metallurgy of London; Chemical, Metallurgical & Mining Society of South Africa of Johnnesburg; American Institute of Mining Engineers of New York, and The Engineer's Club of San Francisco.

C. ERB WUENSCH

An Appreciation of Dr. H. Foster Bain

Dr. H. Foster Bain died unexpectedly on March 9, at Manila, Philippine Islands, where he had recently flown from the United States for professional work for American mining interests. He was stricken with a heart attack from which he never recovered consciousness, and passed away at the hospital of Santo Tomas University, where, with sad irony, he had been interned during the war for two years. He was 76 years of age.

Dr. Bain was one of the most distinguished and internationally well known geologists in the world. A native of Indiana, after graduating from Moore's Hill College he attended Johns Hopkins from 1891 to 1893, and received his Ph.D. from the University of Chicago in 1897. Following several years as a geologist for the States of Iowa and Illinois and the U. S. Geological Survey, he became editor of the well-remembered "Mining and Scientific Press" of San Francisco, later absorbed by "Engineering & Mining Journal," and then editor of the "Mining Magazine" of the Bureau of Mines from 1921 to 1925. He resigned this position to become Executive Secretary of the American Institute of Mining Engineers, where he remained until 1931, at which time he became Executive director of the Copper & Brass Institute. In 1946, on a professional trip to the Orient, he met Manuel Quezon, then President of the Philippine Commonwealth, who persuaded him to become his technical advisor. He remained in this capacity until the outbreak of the war, when he was interned in Santo Tomas until repatriated in 1944. On his return to this country he was appointed a member of the National Engineers Committee to prepare a post-war plan for Japanese industry. In the interim he was engaged by the Government on numerous mineral surveys for the Department of the Interior.

During his long and intensely active life, Dr. Bain was engaged for important

technical work by the Governments of Colombia, Argentina, Japan, and China. He was a prolific writer, and besides numerous contributions to the technical press and scientific societies, he was the author of two well-known volumes, "Ores and Industries of the Far East," and in conjunction with T. T. Read, "Ores and Industries of South America."

So much, however inadequate, for the record. To those of us who knew him well, Foster Bain always will remain an undying memory of an outstanding engineer and perhaps more important, a loyal, understanding friend. I knew him first when he revisited the Wisconsin zinc field in 1915 and aided us in interpreting the geology. Later I was fortunate to work with the wide scope of his technical knowledge, and especially his photographic memory for facts and faces. Once he had met a professional engineer, Bain never seemed to forget him. Still later I rejoined him in the Philippine Islands, and I know how he was literally venerated by the native Philippine engineers for the work he did in broadening and developing the mining industry there. Typical of the man, despite his age when interned during the war he insisted on taking an active part in the camp life, and even obtained a job for himself—besides lecturing on mining for the engineers—as a bookbinder in the camp library.

Dr. Bain was a loyal friend. He was never too busy to give advice and counsel, and his private charities, though many, were never known. Until the end, he had the heart and restless energy of a young man. Frail in appearance, his physical stamina was such that he would frequently exhaust younger men who accompanied him on examination work. Retirement for him was always a year ahead. A mutual friends wrote me today from Manila — "He went the way he would have wished—in full harness as a mining engineer."

W. F. Boericke

LETTERS

Knob Hill Errata

To the Editors

Referring to the March issue, Pg. 59, the retraced reprint of my Republic district geologic map contains several major errors. Some of these are such as to possibly cast doubt on the work by any critical reader; therefore, I would appreciate your arranging to have appropriate corrections made. The errors are as follows:

1. On Section B-B, the Vein is not an "Andesite Vein". The word Andesite belongs above after "Knob Hill".
2. On the map near Granite Creek the word Diorite pertains to two diorite dikes which are omitted and not to the area of Knob Hill andesite.
3. The strange mark in parentheses after FAULT should be a question mark.
4. "Dacite Hill" should be Dacite Sill.
5. On Section A-A the convention used for hydrothermal alteration has been substituted in the basalt capping for the one given on the original map. The basalt is post-mineral.
6. The graphic scale and north point have been omitted. Your readers will be puzzled as to distances and thicknesses.

Lawrence B. Wright
Consulting Mining Geologist
San Francisco, Calif.
March 17, 1948

Michigan Iron Reserves

To the Editor:

My attention was called to some figures quoted on page 87 of your March issue on the iron ore reserves of Michigan. We would be very happy if the figures used were correct and that we could count on the reserves that were mentioned in your article.

Unfortunately, the figures in my estimate were not as optimistic, and my estimate of the direct shipping iron ore reserves in Michigan was 500,000,00 instead of 750,000,000 tons per 100 ft. of depth. There was no depth limit mentioned in my estimate of direct shipping ores, as part of this estimated tonnage must necessarily come from extensions of some of the present mines in depth. The estimate of low grade ores made for the Dulth meeting was 725,000,000 tons per 100 ft. of depth, and this same figure was used again in my paper before the A. I. M. E.

Franklin G. Pardee
Deputy State Geologist
State of Michigan

March 16, 1948

BOOKS *(Continued from p. 123).*

MINERAL RESOURCES OF THE UNITED STATES. By staffs of U. S. Bureau of Mines and U. S. Geological Survey. Public Affairs Press, 2153 Florida Ave., Washington, D. C., 1948. Pp., 212. Price, $5.

A comprehensive summary of the mineral position of the United States, revised and expanded since the original presentation before the New York section of the A. I. M. E. (Min. & Met., April, 1945.) This is the presentation made to the Senate Public Lands Committee in May, 1947 (E. & M. J., June, 1947, pp. 80-83.) and printed by the Public Affairs Press because of the limited supply available from Government sources. Details are given on various minerals, including maps and charts.

MINING CAMPS—A STUDY IN AMERICAN FRONTIER GOVERNMENT. By Chas. Howard Shinn; Alfred A. Knopf, Inc., New York, 1948. Pp. 291. Price, $4.

First published in 1885 and now reprinted for the first time, this work, although written for the serious rather than the thrill-loving reader, is an interesting, readable account of Western mining camps treated from the standpoint of the student of government. The study not only considers the Western camps, but goes into background elements, such as mining codes of ancient and medieval time, German, Spanish, and early American customs, and the life of the missions.

MINE-AIR-CONDITIONING CHART. R. I. 4165, U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. No charge.

Developed by G. E. McElroy, supervising engineer of the mine ventilation section of the health branch of the U. S. B. M. at Pittsburgh, this new type of air-conditioning chart aids in quick determination of psychrometric data and raid calculation of mine ventilation problems. Provision has been made in the chart for correcting data for changes in elevation between 8,000 ft. above sea level to 8,000 ft. below. The chart is described in the Bureau's Report of Investigations, No. 4165.

SOIL MECHANICS IN ENGINEERING PRACTICE. By Karl Terzaghi and Ralph B. Peck. John Wiley & Sons, Inc., New York 16, N. Y., 1948. Pp., 541. Price, $5.50.

The authors are men who have gained, through long experience, an extensive knowledge of the principles and the practice of soil mechanics. The first two parts of their book deal with the physical properties of soils and the theoretical side of soil mechanics. The last part, and the most important from the viewpoint of the engineer, considers the practical side of the subject. It is concerned with getting satisfactory results in earthwork and foundation engineering at reasonable cost. The book points up the inherent complexities of natural soils, and the careful application of experience, theory, and experiment that is required to deal successfully with them.

THE ECONOMICS OF MINING. By T. J. Hoover. Stanford University Press, Palo Alto, Calif. Revised, 1948.

Stanford University has performed the worthy task of revising, bringing up to date, and reprinting T. J. Hoover's work on mining economics. Designed primarily for students and young engineers, this work covers most phases of mining economics, with particular attention to valuation, organization, and management of non-ferrous metal mines. Mature members of the profession have praised the soundness of Mr. Hoover's work, and the book has been widely used.

INTRODUCTION TO MINE SURVEYING. By W. W. Staley, Stanford University Press, Palo Alto, Calif.

After a year on the "out of stock" list, this work on mine surveying has been brought back into print by popular demand . Said to be notable for its practical organization, the book can be used to equal advantage in the field, or in the classroom. The author bases much of his material on extensive correspondence with mining engineers all over the United States, Canada, and Mexico.

REGIONAL NEWS

WASHINGTON

Mead plant reaches capacity production—Glacier Silver Lead acquires Mineral Hill claims

★ Permanente Metals Corporation's Mead plant, at Spokane, started capacity production March 15, with 100 additional men when the sixth potline went into operation. This will increase aluminum pig production by 3 million pounds per month and will mean an expansion of operations at the Trentwood rolling mill where 200 additional men will eventually be added. Spokane will have a new rod and bar mill, according to D. A. Rhodes. Possibly more than 4 million dollars will be spent on the plant during the next 12 to 15 months, and it will be capable of processing more than 120 million pounds of metal annually. Mr. Rhodes predicted the employment of several hundred men in the area as a result of this expansion.

★ A million-dollar construction program has been planned at the American Smelting & Refining Co.'s Tacoma plant. The initial step will be a $230,000 ore unloading and storage plant, according to Earl R. Marble, smelter manager.

★ Articles of Incorporation were adopted in March by West Coast Mineral Association, which was formed in Seattle, in 1923. The first signer was Dr. E. C. Kilbourne, a charter member who is 92 years old. James Louttet, of the Seattle Chamber of Commerce's Industrial Department, informed the organization recently that plans are being made to establish in Seattle the largest depot for distribution of ore on the Pacific Coast.

★ Thomas H. Palmer, of Spokane, announced recently that Columbia Gypsum Products, Inc., will operate a large gypsum deposit containing at least 400 million tons of high grade gypsum at Windermere, B. C. Plans are being made for the installation of a processing plant in Spokane, then a calcining kettle for manufacturing plaster, and later a wall board and lath mill. Almost $700,000 will be spent on the Spokane plant.

★ Mineral Hill silver-lead mine, with 13 patented claims on Mineral Hill Mountain, near Conconully, in Okanogan County, has been acquired by Glacier Silver Lead Mining Co. by issuing 35,000 shares of the company's Class A stock, and a bond and lease for $35,000 to be paid from 10 per cent of the net smelter returns from ore shipped from the mine, according to a letter to stockholders. The company has also acquired the Gubser mine with three lode claims and a millsite at the foot of Mineral Hill Mountain on a bond and lease of $10,000, also to be paid for from 10 per cent of net smelter returns from the ore of these claims. A third property, the Mohawk mine located between the two former properties, has been acquired by purchase contract.

★ According to John Colby, superintendent at Admiral Consolidated Mining Co.'s property, near Leadpoint, lead ore was located recently when drifting to contact zinc ore. Samples assayed 77.5 per cent lead, 0.6 per cent zinc, and 3 oz. of silver. Winter development work was in a zinc orebody. Shipments were sent to U. S. Smelting & Mining Co. at Salt Lake.

★ Grandview mine, in the Metaline district, operated by American Zinc, Lead & Smelting Co. is producing about 40 per cent more than in 1947, according to mine officers. About 525 tons are produced each day. Concentrates run 6 to 7 per cent combined zinc and lead.

★ Mrs. John Gorrien has lost a three-year court battle to regain possession of the Deep Creek zinc-lead-silver mine, in Stevens County, which is now producing about $500,000 worth of ore a year. The decision that Higgenbotham-Jameson Mining Co. has acquired the property by legal methods and not by "coercion and misrepresentation" as Mrs. Gorrien alleged, was made in the Okanogan superior court some months ago and upheld recently by Judge Kemp in Spokane County superior court. Goldfield Consolidated Mines Co. is operating the mine now and milling the ore at the Sierra Zinc mill.

OREGON

Study of offshore resources begins—Perlite being shipped from mines of Dant & Russell

★ At the request of Raw Materials Survey, Inc., Portland, Raymond M. Ladoo, consulting mining engineer, has been in Washington, D. C., undertaking a study of possible offshore sources of raw materials for Northwest industries.

★ According to the State Department of Geology and Mineral Industries, the new perlite industry of the Dantore Division of Dant & Russell, Inc., mined and milled 2,623 tons of raw ore in 1947; 2,130 tons was furnaced and produced 68,771 bags of expanded perlite of 4 cu. ft. each. Last January the company produced 641 tons of raw perlite and shipped approximately 200 tons to a new Dantore furnace installation at Grand Rapids, Mich. Regular shipments of raw perlite to Grand Rapids are beginning from the Lady Frances Mine of Dant & Russell, Inc., located on the Deschutes River at Frieda, a station on the Oregon Trunk Railroad about 14 miles south of Maupin, Wasco County.

★ Chromite mining came to a standstill in Oregon when the Metals Reserve Company ceased buying chromite for stockpiling. However, the State Department of Geology and Mineral Industries reports that the Oregon Chrome Mine on the Illinois River, Josephine County, has recently resumed production and is shipping to the Ohio Ferro-Alloys Co. in Tacoma at the rate of 500 long tons per month.

CALIFORNIA

Development now proceeding at Quartz Hill mine — Empire Star acquires Hoge property — Profit for Natomas Co. down

★ Development of promising orebodies is continuing at the old Quartz Hill gold mine in Siskiyou County operated by Harry Thompson and associates under a lease and option to purchase. Good results are being obtained from current large-scale pilot plant operations being carried on to evolve a treatment method for gold-bearing schist traversing the property. Formerly mined by hydraulic methods, this material is now removed with power shovel and bulldozer, crushed in two stages to about minus-8 mesh, and subsequently passed through jigs, riffles, and undershots. Recovered concentrates are barrel amalgamated, as are those from the small 5-stamp mill handling high-grade ore. Operations are conducted on a one-shift basis, and daily output is about 350 tons.

★ Empire Star Mines Co., Ltd., Grass Valley, Nevada County, has acquired the Hoge gold property near Nevada City. Formerly operated by Great Northern Gold Mines, Inc., headed by the late A. W. Hoge, the mine has been idle for some years. Transfer was made under foreclosure and deed of trust proceedings, for consideration of some $22,000, according to F. G. Finnegan, Empire Star attorney.

★ Natomas Co., one of the state's largest gold dredge operators, showed 1947 net profit before Federal taxes amounting to $1,288,855, compared with $1,313,085 for 1946. Gross income for the year was $3,382,383, as against $3,294,085 the year before. Decreased electric power output resulting from current drought conditions has necessitated some curtailment of dredging operation in the Folsom field where seven of the company's dredges are active. Thomas McCormack is president; R. G. Smith, manager, directs operations.

★ Production Research, Inc., of Pasadena, is drilling a perlite deposit 8 miles north of Cantil, Kern County, owned by Della G. Gerbracht, of Randsburg.

★ A dragline dredge is being installed by Foley Bros., Inc., of St. Paul, Minn., for exploitation of the Hammon gold-tungsten placer ground north of Randsburg, formerly worked by Kern Placers, Inc. Harry Dorvinen is superintendent. The operation is expected to go forward on a two-shift basis, employing about 20 men.

★ Milling operations are reported to have been started at the Fine Gold mine, east of Railroad Flat, Calaveras County, operated by Irving Jordan, of Los Angeles. The mill is equipped with a jaw crusher, ball mill-classifer, flotation, thickener, and filter units.

NEVADA

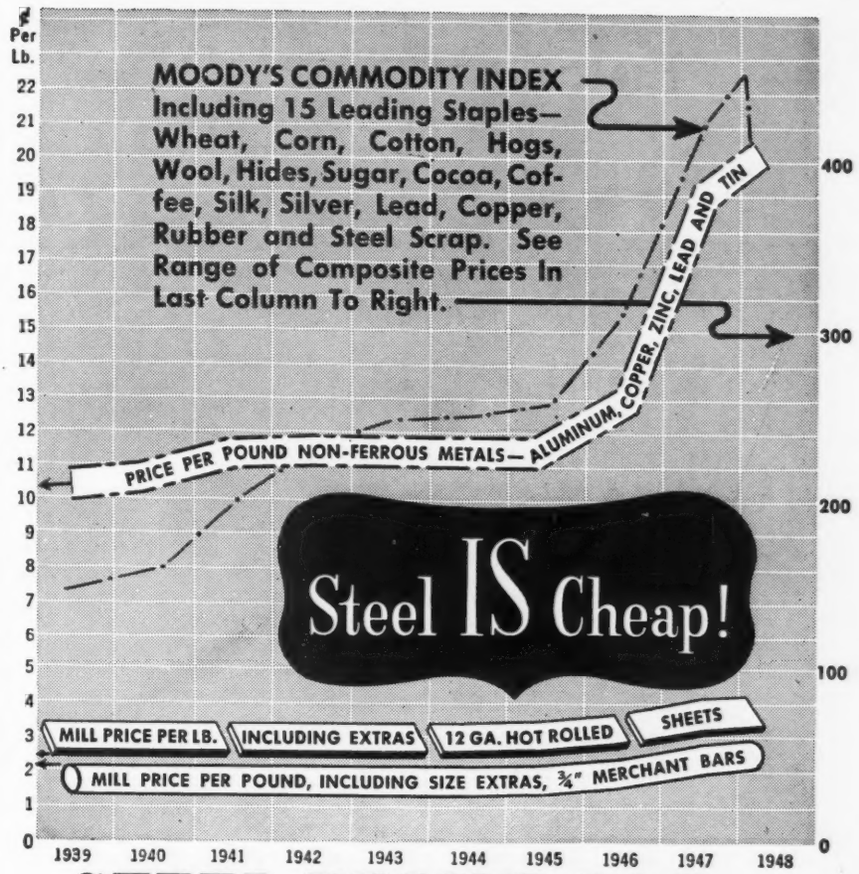
White Pine County produces bulk of ore — Nevada Equity opens old shafts in Lander Hill section

★ Getchell Mines, Inc., in the Potosi district, has been conducting research work to develop a more efficient and lower-cost flow-sheet for the cyanide plant. With current additions to the crushing and grinding circuit, the plant is designed to treat in the future 1,500 tons per day, primary flotation replacing costly roasting in dealing with the highly refractory arsenical pyrite content and enabling more effective sliming before cyanidation.

★ Mines of White Pine County, including major producers of the Ely or Robinson district, produced the bulk of Nevada's 1947 ore output. Kennecott Copper Corporation, Nevada Mines Division, reported to the tax commission a 10-year high of 3,321,783 tons with net profit of $4,732,717. Consolidated Coppermines Corporation, Kennecott's neighbor, reported output of 2,432,919 tons with net income before depletion of $1,053,345.93.

★ Consolidated Chollar, Gould & Savage Mining Co., is again operating its open-pit silver-gold mine and 400-ton cyanide mill at Gold Hill on the Comstock lode after a two-months shut-down, enforced by lack of water. F. V. Dempsey, superintendent, reported that during 1947 power shovels removed 432,500 cu. yd. of overburden from the pit and the mill treated 126,000 tons of surface ore with production of $220,000.

★ Thomson Divide Mining Co. has started test work on the 2,400-acre placer property in the Leonard Creek district of northwestern Humboldt County, leased from Eureka-Hamburg Mining Co. The Thomson company is preparing to move a dragline unit to the property from its formerly productive operation on the Klamath River in California. Lauren S. Fish is president of Eureka-Hamburg, A. L. Damon, manager for Thomson, and Addison Clark, consulting engineer for both.


¢ Per Lb.
MOODY'S COMMODITY INDEX Including 15 Leading Staples— Wheat, Corn, Cotton, Hogs, Wool, Hides, Sugar, Cocoa, Coffee, Silk, Silver, Lead, Copper, Rubber and Steel Scrap. See Range of Composite Prices In Last Column To Right.
PRICE PER POUND NON-FERROUS METALS— ALUMINUM, COPPER, ZINC, LEAD AND TIN
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MILL PRICE PER LB. INCLUDING EXTRAS 12 GA. HOT ROLLED SHEETS
MILL PRICE PER POUND, INCLUDING SIZE EXTRAS, ¾" MERCHANT BARS
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300
200
100
0
1939 1940 1941 1942 1943 1944 1945 1946 1947 1948

STEEL PRICES LAG...

Far Behind Prices of Most Commodities!

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1st, that steel prices are relatively low—

2nd, that price advances have been comparatively modest.

For example—note that the mill price, including extras, on 12 ga. hot rolled 60" x 100" steel sheets in 1939 was 2⅓¢ per lb. In February 1948, it had advanced less than 1¢ to 3¼¢ per lb. In the same period ¾ inch merchant bars, including extras, advanced from less than 2-1/5¢ to slightly over 3¢ per lb.

Sheets and merchant bars are two finished steel items in most popular demand. They comprise nearly 22% of all mill shipments of finished steel in 1947.

Now, compare prices on steel's most wanted items with composite prices on the five non-ferrous metals. In 1939 it was over 10½¢ per lb. By 1948 it had zoomed to over 20¢ per lb. Or, compare the steel industry's record of holding prices down with prices on the 15 leading commodities which affect the cost of living most. Composite prices of these shot up from an index of 150 in 1939 to over 450 as of January, 1948.

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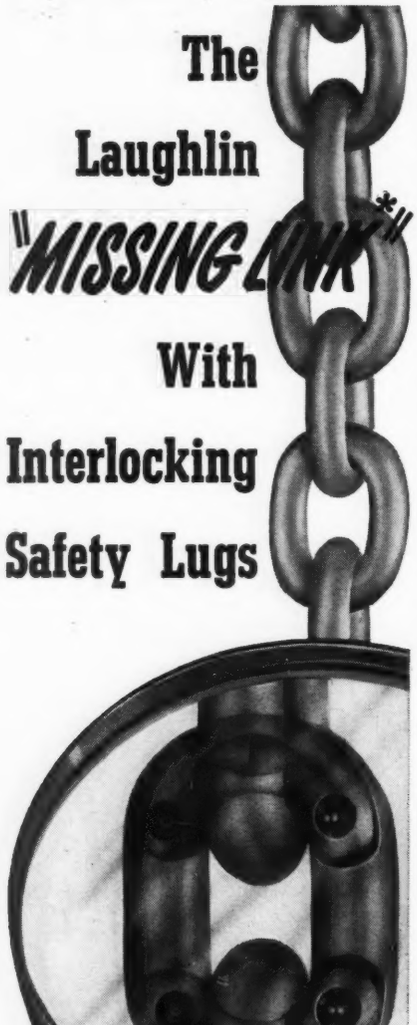

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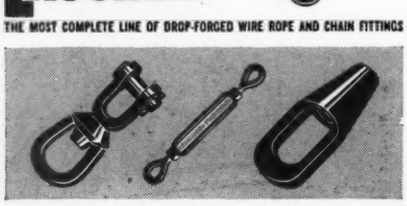

NEVADA *(continued)*

★ Newmont Mining Corporation is preparing to construct a 100-ton mill at Goldfield, employing flotation and cyanidation, on the site of the Florence Goldfield cyanide mill, destroyed by fire some years ago. A water line is being laid some 4,000 ft. to the Laguna shaft of the Goldfield Consolidated Mines Co. Joseph Mihelich, in charge of construction, said he would employ about 50 men in this work.

★ Additional pumping equipment and power facilities are being installed at the Eureka-Richmond mine at Eureka, Nevada to start unwatering the Fad shaft. The water level rose to approximately 1,050 ft. below the collar because of a watercourse which was intersected recently on the sixth or 2250-ft. level. Unwatering has been scheduled to start in mid-May and is expected to reach the sixth level by July.

In the past months the company had been pumping 1,200 to 1,600 gal. per min. Installed pump capacity was approximately 2,500 gal. per min. from the sixth level. A steel water door had been installed on the sixth level capable of withstanding a 500-ft. head. These precautions were taken because development headings were expected to penetrate a wet dolomite on the sixth level. Recently a watercourse was intersected about 50 ft. from the shaft carrying about 2,000 gal. per min. As this was approximately 1,000 gal. in excess of installed pumping capacity, the water door was closed. Pressure on the door became excessive and the door burst, causing a loss of the sixth level pump station. Pumping units on the fourth or 1700-ft. level were removed before the water reached that level. The second level (800-ft.) is above the water table which is approximately 1,000 ft. below the collar.

Recovery plans are practically complete, and call for pumping capacity of 5,000 gal. per min. from the sixth level, and 6,000 gal. per min. from the second level. Enlargement of the second level station is now in progress.

IDAHO

Three companies pool finances to sink shaft—Sunshine and Bunker Hill report increased earnings for 1947

★ Federal Mining & Smelting Co.'s report for 1947 states that the Morning mine operated at a loss of $23,683.51 during the month of October; a profit of $5,840.02 in November and a loss of $13,424.92 in December. During the year, because of a labor shortage for mine production, the company milled 33,481 tons of old mill tailings and dump material.

The management proposes to carry on considerable exploration work at the Morning, according to the report which concluded that there is a possibility of a new orebody being found toward the north of the Morning property. The company has optioned the property immediately adjoining on the north and intends to carry on the proposed exploratory work soon.

★ Three local mining companies, the New Hilarity, United Mines, Inc., and Mohawk Silver-Lead, in the Kellogg area of the silver belt, have formed a merger whereby they agree to pool their finances for the sinking of a deep shaft at a central point that will benefit all three properties, situated between the Bunker Hill and Sunshine mines. Ralph Neyman, mine superintendent for the Hecla company, will have supervision of the operation.

★ Sunshine Mining Co.'s annual report shows net earnings of $1,025,934 for 1947 as compared with $519,713.33 in 1946, according to R. M. Hardy, president. The accompanying mine report by R. D. Leisk, resident manager of Sunshine, says that "developed ore reserves are now estimated at 1,270,000 tons above the 3700 level. This estimate includes the total estimated reserves in which other companies share in the production, and represents the total estimated tonnage above 3700 level presently available for mining and treatment by Sunshine Mining Co. The portion of this reserve represented by Sunshine's interest is equivalent to 808,000 tons, including 432,000 tons in the Sunshine vein.

"Mining on the Sunshine vein, which was suspended in 1943, was resumed on a small scale early in the year," continued Mr. Leisk. "Seven stopes were rehabilitated and produced 22,800 tons of ore of an average grade of 29.6 oz. of silver per ton. The rate of production from the Sunshine vein will be increased as new working places become available."

Referring to the recently opened Yankee Girl vein, a parallel structure 1,000 ft. south of the Sunshine, Mr. Leisk reported: "Small scale stoping operations were commenced on the east ore shoot on the Yankee Girl vein on the 3100 level and accounted for a production of 6,430 tons of ore of an average grade of 31.1 oz. of silver per ton."

Since the beginning of the present year the company has started a crosscut on the 3700 level which will open the Yankee Girl vein 600 ft. deeper and will determine the importance of this orebody in ground owned by Sunshine, in Metropolitan ground to the east and in Sunshine Consolidated ground to the west.

★ Silver Dollar Mining Co. reported recently that the company's independent shaft was completed to the 2800 level, and that a crosscut has been started to intersect the vein system which the shaft cut through on the 2500 level.

C. O. Dunlop, president of the company, stated that the 1947 income from Silver Dollar's one-third share in the Rotbart area being mined by Sunshine totaled, after deducting operating costs, $365,015.58, from which taxes took a toll of $157,724.93, leaving a net income of $207,290.65, out of which stockholders received in dividends $177,853.37.

Known ore reserves in the Rotbart area total 288,000 tons above the 3700 level, according to E. G. Gnaedinger, engineer. From stopes on the 2700, 2800, 2900, and 3100 levels 17,143 tons of ore were extracted and treated for Silver Dollar account in 1947. This ore averaged 60.47 oz. of silver; 3.5 per cent lead and nearly 1 per cent copper per ton.

★ According to reliable report Bunker Hill & Sullivan Mining Co. at Kellogg earned in 1947 the equivalent of $2.97 per common share. The company's sales of metal are reported at $29,239,365, as compared with $13,810,706 in 1946. Bunker Hill's mine output for 1947 is reported at 15,985 tons of lead and 3284 tons of zinc, 1,118,304 oz. of silver. The mining property of the company covers about 5000 acres and consists of 407 patented and 63 unpatented mining claims.

Bunker Hill has announced that it will make a large-scale experiment in mining and milling low grade ore, and is preparing a block of ground containing some 5 million tons of ore averaging 3 per cent lead and ½ oz. of silver per ton, which was left in the wall rocks of the old upper workings after the high grade ores had been removed.

★ Hecla Mining Co.'s annual report for 1947 shows receipt of $1,014,675 in dividends from subsidiary companies, the Sullivan Mining Co. paying $750,000; Polaris Mining Co., $189,675; and the Resurrection Mining Co., $75,000. Hecla's principal operation in the Coeur d'Alene district, outside of subsidiary company activities, is the tailing plant at Osburn. Production of this plant was cut down in 1947 to two-thirds of former capacity, according to L. E. Hanley, president and manager of Hecla. However, he said, "by extending the area to be worked on lower grade material, we expect to keep the operation going through 1948."

He reported a better supply of labor than in 1946 and said, as a result, the company's Star mine at Burke produced 50 per cent more tonnage than during last year. Diamond drilling in the Metaline district, where the Sullivan Mining Co. holds a large acreage, is being carried on steadily, says the report.

★ The U. S. Geological Survey and the U. S. Bureau of Mines now have crews at work in the Coeur d'Alene district preparing a map and geological study of what has been locally designated as the "silver belt," embracing a mineral territory over 20 miles in length, from the Bunker Hill mine at Kellogg to the Montana state line east of Mullan.

★ The annual report of the Howe Sound Mining Co. announces that development work will continue on the Blackbird cobalt-copper deposit at Forney, Idaho, on the Salmon River, which the company holds under option. The deposit has been diamond drilled by the U. S. Bureau of Mines, the result indicating a large deposit.

★ The Callahan Consolidated Mining Co. has entered into an agreement with the Coeur d'Alene Mines Cons. Mining Co. to finance completion of a long crosscut prospect tunnel being driven across the strike of the silver belt from the 2800 level in the Coeur d'Alene Mines shaft. This tunnel has now been advanced 3200 ft. and will eventually be approximately 6,000 ft. long. In return for financing the project, Callahan Consolidated will receive varying interests in ore produced from veins that may be encountered.

★ The Pearson Mining Co. directors have taken official action toward liquidating the company and distributing 200,000 shares of Silver Summer Mining Co. stock in the nature of a liquidating dividend. The stock is quoted at $1.59 per share.

UTAH

Silver King company strikes new fissure — Premature blast kills two miners

★ In no uncertain terms members of Utah's oldest local of International Union of Mine, Mill & Smelter Workers voted their censure of communist interference in the international union at a referendum vote conducted April 8 at Eureka and Santaquin. As a result of the secret ballots cast by 275 of the 285 members of the union, Tintic District Miners Local No. 151, one of the five orginal units to establish MMSW, voted two to one to leave the international organization, and to affiliate with Progressive Metalworkers' Council.

The Tintic union was the eight in Utah and Nevada to secede from MMSW and to be chartered by PMC. Other locals in the two states who took this action recently were Garfield Clerical and Technical Workers; Gold Medal Powder Workers' Local 526, Spanish Fork, Utah; and Copper Canyon, Nev., Local 585. Meanwhile, six locals took action pledging loyalty to MMSW and condemning PMC for raiding.

Because the Tintic local is the home union of George J. Wilde, now Utah-Nevada representative for Progressive Metalworkers Council (who recently challenged MMSW to join with employers and PMC in asking the Utah Labor Relations Board to conduct a "consent" election which would reflect the opinions of the rank and file membership), MMSW exerted intensive efforts to prevent the secession. Hundreds of handbills were passed out in Eureka and Santaquin, and placards were paraded about by aleged rprsntatives of the international organization.

★ As applied to accidental on-the-job injuries or designated occupational diseases, Utah's Workmen's Compensation Act is an employee's exclusive legal remedy, and he may not sue his employer in common law courts on such counts, the State Supreme Court ruled March 25.

Permitting an employee to sue in court for partial disability and then charge the employer with liability regardless of fault in cases of total disability "would grant

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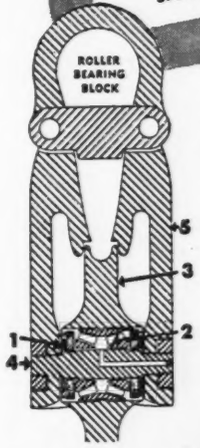

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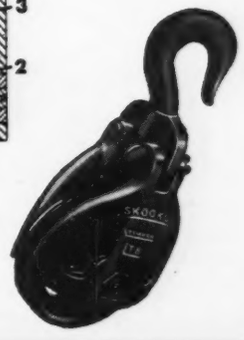

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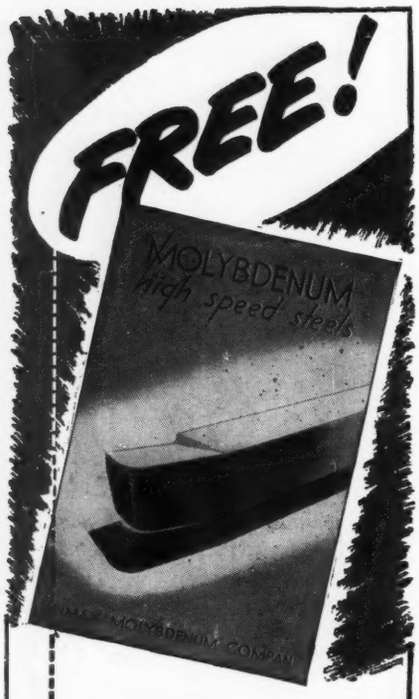

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UTAH *(Continued)*

the employee two remedies for one wrong," the majority opinion states. ". . If the legislature can deny the right to rely on the defense of contributory negligence and assumption of risk, and make the employer absolutely liable regardless of fault, then it also has the right to say that compensation shall not be awarded until the employee has brought himself within terms of the statute."

The ruling was contained in the court's first definitive decision on Utah's occupational disease statutes. In it Nick Masich was denied the right to sue U. S. Smelting, Refining and Mining Co. for disability from silicosis allegedly contracted while employed by the company.

★ Kennecott Copper Corporation has filed an occupational tax of $1,198,293 with the Utah State Tax Commission. This is 430 per cent of the 1947 occupational tax, which was low because of the six-month strike in 1946. Assessed valuation for this year has been fixed at $95,385,481, mine valuation, and $17,795,000, improvements. This has been exceeded only by the peak wartime valuation of $121,500.000 in 1944. On the new valuation, state, county and school district taxes will be computed. If levies remain approximately the same as last year, a 60 per cent higher tax will be paid next fall than last. Kennecott now has a Utah pay roll of $13,000,000 per year, with 4,500 employees.

★ Silver King Coalition Mines Co. stock jumped $1 per share March 4 on the New York exchange. The increase was attributed to strike of a new fissure on the 1,000-ft. level which appears to be related to an orebody of "considerable value" on the 1,960-ft. stope. James Ivers, vice president and general manager, said the two fissures "very definitely appeared to be related."

★ Park Utah Consolidated Mines Co. mined 41,460 tons of ore in 1947 or approximately one-third more than in 1946, according to the annual report released by Paul H. Hunt, vice president and general manager. Total income during the year was $1,470,305 compared with $1,245,036 expenses. Net quick assets as of Dec. 31 were $1,462,221, or an increase of $203,623. This was reduced by $209,190 when a 10c. dividend was paid during March.

★ A premature blast took the lives of two miners, T. W. Weaver and P. W. Confer, in the Lark mine of the U. S. Smelting, Refining & Mining Co., on March 18, but the cause was not determined, C. W. Spence, state metal mine inspector, reported. The accident occurred on the 500-ft. level about 20,000 ft. from the mine portal. According to the mine superintendent, the men apparently used the safety "spitter" and obeyed other safety rules.

★ U. S. Smelting, Refining & Mining Co. produced 21,403 tons of lead and zinc in Utah during 1947, approximately double that of 1946 when production was strikebound for six months.

★ Chief Consolidated Mining Co., Eureka, ore output during 1947 was 93,676 tons compared with 85,128 tons in 1946, it was reported by Cecil Fitch, president. Net income to surplus was $36,107, compared with $78,510 for 1946. Encouraging ore development at depth in No. 1 Chief mine and important development work on the Evans properties were reported.

ARIZONA

Kennecott converts to open-pit methods at Ray—Development of Victoria Gold Mines continues

★ The San Manuel Copper Co. began the sinking of a new 2,100-ft. shaft in April, according to W. P. Goss, general manager of the organization. The shaft, housing four compartments, will be the first underground construction work in the development of a 460-million-ton ore deposit located about 45 miles northeast of Tucson. Surface construction consisting of 20 buildings and two large dormitories is nearing completion.

Building operations followed almost three years of exploratory work on what is believed to be the second largest ore site in the United States, it was reported recently by Charles F. Ayer, president of the Magma Copper Co.

★ Conversion from underground to open-pit methods has been started at Kennecott Copper Corporation's mines at Ray, 91 miles north of Tucson. Kennecott management expects the work to be completed and some tonnage available for mining and treatment by 1950. The company in its annual report predicts that this partial change from underground to surface mining will extend the life of the property, expand production, reduce costs and improve the labor situation.

★ A gold strike six miles from Morristown brought an old-time gold rush of prospectors to file claims in the area within the past month. First word of the discovery came when John Laskowsky, who made the strike, brought in 50 oz. of gold to the express office for shipment to the Federal mint at San Francisco.

★ Charles Dunning, director of the Arizona Bureau of Mineral Resources, said that the deposit is different from the ordinary pocket in a vein. Here there is no vein and the gold appears to be at or near the contact of a flat intrusive diabase sill with the granitic rock of the area. It occurs with quartz and heavy red hematite.

★ Congressman John R. Murdock of Arizona is seeking additional information concerning the areas of Arizona which could be developed most profitably in the establishment of a domestic manganese supply program. Mr. Murdock is especially interested in the areas which could be opened up through the construction of "access roads" with federal funds.

★ Information from the Department of Mineral Resources indicates that the Emerald Isle property expects to increase production soon from 450 to 900 tons daily.

★ Production from the Tennessee mine, Chloride, Mohave County, has been cut to 60 tons daily because of water shortage. The water table in the southwest is falling rapidly as the result of a long drought. The Tennessee mine, in operation for more than 50 years, is one of the principal lead and zinc producers of the state. Present ore production is south of the shaft on the 1,000 ft. level; average width of the ore is five feet.

★ Much interest is being shown by mining men of northern Arizona in the development of the Victoria Gold Mines property six miles southeast of Oatman. The holdings consist of twelve claims, six of which are patented and the others held under location.

Work was first done on this property in 1914. Present development consists of sinking a vertical shaft 240 ft. to the Aratava vein in the dip. At this time the shaft is just entering the vein. Three large veins parallel the length of the property and show long shoots of commercial free gold ore on the surface.

★ The Premis Chemical Co.'s Walker mine, in the Cochise Johnson district, consisting of four patented claims, has been acquired by Frenstrom & Sons, of Tucson. Ray Frenstrom is developing the tungsten claims for the new owners.

★ O. C. Reid, Nogales, owns the patented claim situated on the high limestone outcrop south of the Washington Camp and above the Pride O' the West. Mr. Reid is developing this property and is ready to ship several cars of high grade zinc and copper ore from the Pride dump.

★ Eighty-three cars of ores and concentrates crossed the Mexico-U. S. border at Douglas March 30 to set a record one-day delivery from Nacozari, Sonora, according to B. O. Long, manager of the Nacozari railroad line. Mr. Long added that shipments of the Mexican ore are increasing steadily. About 90 per cent of the ore concentrates go to the Phelps Dodge smelter in Douglas; the zinc goes to Shattuck-Denn in Bisbee; and some lead to Hayden. Shipments were sent from about six firms in Nacozari, but the largest single shipment came from the Montezuma Copper Co.

★ The Old Dick mine, located in the Eureka Mining District of Yavapai County, about 72 miles west of Prescott, is mining 40 tons of zinc ore daily. Owned by the Lawler Estate, the mine is being worked under an agreement with the Hillside Mining Co. and the ore trucked to the Hillside mill for treatment. It is developed by a 75-ft. shaft and a 200-ft. crosscut tunnel to the vein.

★ Inspiration Consolidated Copper Mining Co. is stripping the overburden from that portion of its orebody which is to be mined by open-pit methods, and actual mining in the area is expected to start soon.

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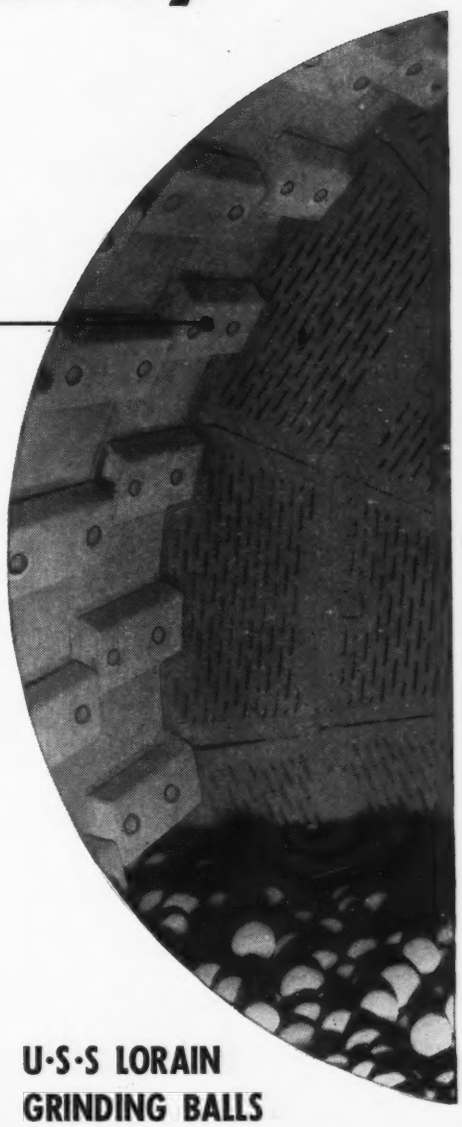

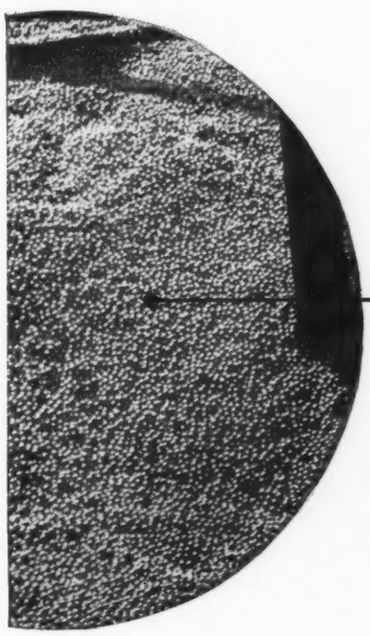

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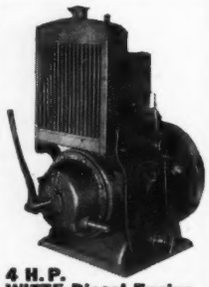

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ARIZONA *(Continued)*

★ The James Group, Huachuca district, Cochise County, has been taken over by Harper & Turner, Tucson. The property is in Brown Canyon, adjacent to Fort Huachuca Military Reservation. Permission to construct an approach road crossing the reservation was granted recently in Washington. When this is completed Harper will request an examination by the Arizona Department of Mineral Resources.

In the past, considerable production of scheelite was recorded from a tunnel which has since been extended close to the Reservation line. Here lead and copper ore was encountered in development amounts which perhaps has its outcrop and showings located within the Reservation at considerably higher horizon Previous access to the tunnel was by cableway, and the new road will facilitate development of these hitherto restricted grounds. A mine and mill is planned.

★ The Stewart Group, seven tungsten claims situated east of the General Electric Co.'s tungsten mine, Los Guijas, Pima County, was recently acquired by Lester Frenstrom, who sold half interest to Roderick and Associates, of the Ohio Development.

MONTANA

Dillon, Helena chapters, M.A.M. hold meetings—Milling resumed at Silver Bell

★ At the annual meeting of the Last Chance Gulch Mining Association, Helena chapter of the Mining Association of Montana, on March 4, Donald B. Hoiekvam, Helena, consulting engineer, was elected president for 1948; Kuno Doerr, Jr., manager of the East Helena plant of the A.S.&R.Co., was elected program vice president; Wilbur F. Crisswell, chief engineer for Porter Bros. Corporation, was elected membership vice president; Charles R. Brazier, secretary of the Golden Messenger Corporation, was re-elected publicity vice president; and Hugh K. Gaw, Callahan Mining Co., was re-elected secretary-treasurer.

★ A. V. Taylor, Jr., Philipsburg, president of the Mining Association of Montana, has appointed committees to arrange details of the Tenth Summer Meeting of the Association, at Virginia City, on July 30 and 31.

★ North Butte Mining Co. has issued its annual report for the 1947 calendar year. The company, which had 311 men on the payroll, shut down its operations on August 10, 1947, due to the presidential veto of the Allen premium price bill. During the operating period of seven months and ten days, there were produced 4,531,106 lb. of returnable copper, 97,658 oz. of returnable silver, and 52.99 oz. of returnable gold, having a net value after payment of freight on ores and treatment charges, of $1,086,329.46. Development work done during 1947 consisted of 1,288 ft. of drifts and laterals, 1,516 ft. of crosscuts, 1,830 ft. of raises and 15,252 cu. ft. of excavation for stations and skip pockets. The company had made plans to substantially increase its production if premium prices had been continued. Paul A. Gow, Butte, is president and general manager, Howard D. Smith, San Francisco, consulting engineer.

★ A. V. Trent, Helena, co-partner for many years in the assay firm of Goodall Brothers, Helena, has purchased the interest in the firm held by the late Archie Goodall and is now the sole owner of the business, which will continue to conduct custom assays and act as the representative of shippers at the smelters in Montana.

★ Beaverhead County Mining Association, Dillon chapter of the M.A.M., held a meeting devoted to mine safety on March 13, at which John Collins, president, was chairman. The meeting was called at the request of Walter H. Myers, Virginia City, president of the Montana Mining Section of the National Safety Council, Mr. Myers being one of the speakers. Other speakers were Oscar A. Dingman, Butte, secretary of the Montana safety section; John L. Boardman, Butte, chairman of the program committe of the Montana safety section and national chairman of the mine safety section of the National Safety Council; and Carl J. Trauerman.

★ Swansea Mines, Inc., of Helena, started milling its Silver Bell mine in March. Previous to suspension in 1942, about 50 tons per day were treated by the flotation plant. Mill capacity has been increased to 200 tons. Mill and mine equipment are diesel-powered. In 1947 a 23,000-volt electric transmission line was installed to connect with the Montana Power line.

Development was started in the mine two years ago, and is still underway, on a new orebody south of the Silver Bell fault, and separate from the previous workings. The new ore contains copper in greater quantities than the old ore. Oscar Fullner is superintendent and C. L. Hewitt is general manager.

WYOMING

High grade phosphate rock at Kemmerer — Bureau expects to continue lab at Laramie

★ Duard Crockett Wray, president of Phosphate Mines, Inc., Kemmerer, states that his company has recently reopened their phosphate property and are now prepared to deliver high grade phosphate rock, guaranteed 30 per cent-plus P_2O_5 content, crushed to ½-in. minus, at $5 per net ton at their loading ramp seven miles north of Kemmerer. By July 1st, the company will be in a position to deliver phosphate rock milled to minus 100 mesh, suitable for dusting on crops.

★ It is expected that the U. S. Bureau of Mines petroleum and oil shale laboratory at Laramie will remain in operation for at least five years longer, upon enactment of a bill extending the synthetic fuels research program, according to Ralph Espach, laboratory petroleum engineer. The plant carries a payroll of about $260,000 per year.

★ A jade property is being worked under the guidance of Bert Rhodes in a region 60 miles southeast of Lander. Considerable material has been exported to Shanghai, China.

COLORADO

Cresson mines produces values at depth—Bazooka to be used to bring down ore hang-ups

★ Headquarters of the Uranium Vanadium Cooperative Association, representing Colorado, Utah and New Mexico, will be set up at Dove Creek in Dolores County. F. A. Sitton of Dove Creek was elected president at an organization meeting at Grand Junction. Howard Balsley of Moab, Utah, was elected vice president, and John L. Robinson, of Dove Creek, was named secretary and treasurer. The cooperative hopes to enlist all independent producers of vanadium and uranium ores, so that the association may act as a bargaining unit in marketing the ores. The purchaser, of course, would be the Federal Government.

★ Two new veins of gold ore are being followed on the 20th level of the Cresson mine at Cripple Creek. The ore is believed to be at least as fine as that taken from upper levels of the mine.

"The real significance of the Cresson strike," said Merrill Shoup, president of the Golden Cycle corporation, "is that it proves the values go down. We know the ore goes down in the Ajax mine not far distant. Since the Ajax was first drained by the Carlton tunnel in 1941 we have taken out gross values of 3 million dollars."

★ The Medicine Bow Mining Co. of Harlingen, Texas, has completed the purchase of the Pinkham Creek copper property in Jackson County. A car of commercial-grade ore has been shipped. Because of labor shortages the company was forced to suspend operations last July. The property has since been leased to Paul L. Jones, former manager of the company, who plans to start construction of a mill soon.

★ The Little Annie mine group, a former gold producer at Summitville in southern Rio Grande County, probably will be reopened this spring, according to Fred Jones, State mining commissioner. The mine, which operated throughout the war and has yielded millions of dollars of free gold, has been closed more than a year. Ben T. Poxson is president of the company controlling this property.

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COLORADO *(continued)*

★ Cresson Cons. Gold Mining & Milling Co. at Cripple Creek operated at a net loss of $37,719 in 1947, according to a report by Merrill E. Shoup, president. The company produced 14,921 dry tons of ore with a net value of $2.65 a ton. Average net value from 1903 through 1946 was $9.62 a ton. Rising costs of labor and material was blamed for the increase.

Mr. Shoup reported a net income of $8,072 for the Golden Cycle Corporation in 1947. Earnings for 1946 totaled $20,252. The Golden Cycle mill handled 420,062 tons of ore in 1947, the highest since 1941, but the average per ton was only $5.95, compared with $10.30 in 1941. The company and lessees produced 20,209 tons of ore from the Ajax mine. Total gross value was $496,152, an average per ton of $24.55. Pointing to the benefits derived by the Ajax from the Carlton drainage tunnel, Mr. Shoup said that since 1941 the Ajax has produced 205,223 tons of ore of gross value of $3,196,191 from areas drained by the tunnel.

★ Climax Molybdenum Co. produced 11,512,719 lb. of molybdenum during 1947 and sales amounted to 9,702,875 lb. in the U. S. and 1,134,714 lb. abroad, Arthur D. Storke, president, reported. Climax estimated that in 1947 world output of molybdenum was 28,943,000 lb. against 21,000,000 lb. in 1946. The increase last year was said to be the result of substantially greater recovery of molybdenum as a by-product from some of the important copper operations. It was stated that the 1946-47 rate of consumption of the metal in the U. S. is higher than that in 1938, both as to total and as to quantity related to the output of steel.

★ E. S. Gould and associates have acquired title to some 25 or more patented claims around the old town of Crystal in the Aspen district. These claims produced good tonnage in early days and the new owners plan to bring them into production again.

★ The Golden Cycle mill in Colorado Springs treated a total of 420,026 tons of gold ore during 1947 which produced $2,501,074. This compares with a production of $1,972,910 during 1946.

★ Part of the Sweet Home group near Fairplay, owned by E. C. Spray of Denver and leased to G. O. Lear, has opened some lead, copper and silver ore. With the loss of the premium on the base metals, however, Mr. Lear has curtailed shipment of this ore to the A. S. & R. smelter at Leadville.

★ Seeton Mines, Inc., is reopening the Columbine group of lode claims in the Tin Cup mining district of Taylor Park and converting a small gravity concentration test mill to the cyanide process. The cyanide tests proved successful, but recent batch tests with flotation have showed a higher recovery than was thought possible with flotation on a gold ore so thoroughly oxidized. Meanwhile, Seeton Mines has also been operating a 5-8-yd. dragline placer outfit in Bertha Gulch.

★ Eric Bock, operator of the Capital Prize mine at Georgetown, contemplates the use of a wartime bazooka gun in bringing down stope fills in the Capital Prize. The use of a bazooka on certain stope fills will eliminate the danger to miners who would otherwise climb up under the old fills and place a charge by hand. Governor Knous of Colorado, in a message to Mr. Bock, stated that the idea appealed to him and that he would extend his cooperation in this venture.

★ Harrison S. Cobb and James Pastore are working the Ingram mine, at Salina in Boulder County. A three-man crew produces 50 tons of gold ore a day.

★ W. LeRoy Apland, of Ames, Iowa, and his partner recently mined gold ore in the Kicking Horse mine at Jamestown, Boulder County, that assayed up to $12,895 a ton. Mr. Apland was disabled in World War II and came to Colorado last April to regain his health. Last fall he purchased a half interest in the Kicking Horse mine which had not been operated since before World War I.

NEW MEXICO

U. S. Smelting sinks new shaft—Large pumice mining and processing project planned

★ The Atwood Copper Mines, a few miles south of Lordsburg in Hidalgo County, have announced the completion of the unwatering of the 625-ft. level and the cross-cut to the vein on that level. Development work on the vein has been started on the 625 level and all results are reported satisfactory. The Atwood, operated by C. H. McIntosh, operator, and W. S. Harrison, superintendent, under lease from J. L. Augustine has been a substantial copper producer for several years and is making normal shipments at this time along with the maintenance of its development program.

★ Last Chance Mine, in the Pyramid Mining District 7½ miles south of Lordsburg in Hidalgo County, is being leased by C. W. Walker and J. W. Shafer from Peter J. Fairly. Silver ore with a small copper content is being extracted from the old workings and shipped to the International Smelter at Miami, Arizona.

★ The Pumice Corporation of America with its pumice mine a few miles north of Grants and its processing plant in Grants, Valencia County, announces through its general manager, J. A. Freeman, Jr., that an additional 600 ft. long area is being stripped of overburden on the west extension of the deposit. The operation is going at full capacity.

★ Increased water seepage on the 300 ft. level of the potash mine of International Minerals and Chemical Corp., 20 miles east of Carlsbad in Eddy County, exceeded the capacity of the pumping installation on that level and allowed water to

go down the shaft and halted mining operations in the water-soluble potash deposit for three days. The escaping water volume was not large and did not spread to workings other than those in the immediate area of the shaft bottom. Damage was slight and the installation of additional pumping equipment enabled resumption of operations March 18, three days after the overflow.

★ It has been announced that J. W. O'Brien of the Mudrite Chemical Corporation of Texas will commence construction of a mill and production of barite from surface deposits near Hatch in Dona Ana County soon, with an expected output of about 1,000 tons per month.

★ The substantial clay utilization industry of Gallup represented by The Gallup Brick and Clay Co., owned and operated by Frank George, is expected to greatly increase production of high quality brick and tile made from local clays this year. The new plant built by Mr. George last year will be ready for full capacity production as soon as weather permits the mining and handling of the clays. Mr. George expects to complete his equipment installations in the testing laboratory he built last year at the site of the new plant, which will supply him with the facilities for working out more products and superior clay mixes for a more varied industry.

★ Leo H. Duriez, general superintendent of the U. S. Smelting Refining and Mining Co. in New Mexico, announced recently that his company is sinking a deep shaft approximately 2½ miles northeast of its Bullfrog Mine in Grant County. The shaft will be known as the Princess and is said to be primarily for exploration purposes although it has been indicated that there may be underground connections with the Bullfrog.

★ The General Pumice Corporation has been incorporated under the laws of New Mexico and is qualified to do business under the laws of Texas. The corporation has acquired certain pumice deposits in northwestern New Mexico located about 28 miles northwest of Santa Fe and is in the process of acquiring other deposits and leases. The corporation announces that it will shortly absorb Pumice Building Materials, Inc., of Lubbock, Texas, a block plant operation, and a factory operation in the same city. The announcement states that a modern mining operation with crushing, grading and sizing equipment with a capacity of processing 1,000 tons of mine-run pumice per day will be constructed and is expected to be in operation by June 15, 1948.

★ The Molybdenum Corporation of America mine and mill were closed on March 23 when workers chose to strike over a general wage increase dispute. Negotiations between company officials and A. F. of L. representatives failed to bring about a satisfactory wage hike adjustment in that the union-demanded increase exceeded the amount the Molybdenum Corporation deemed it economically possible to pay.

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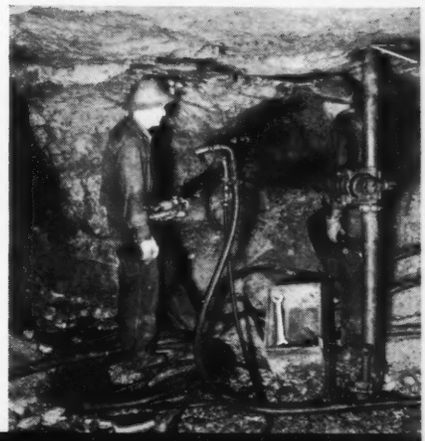

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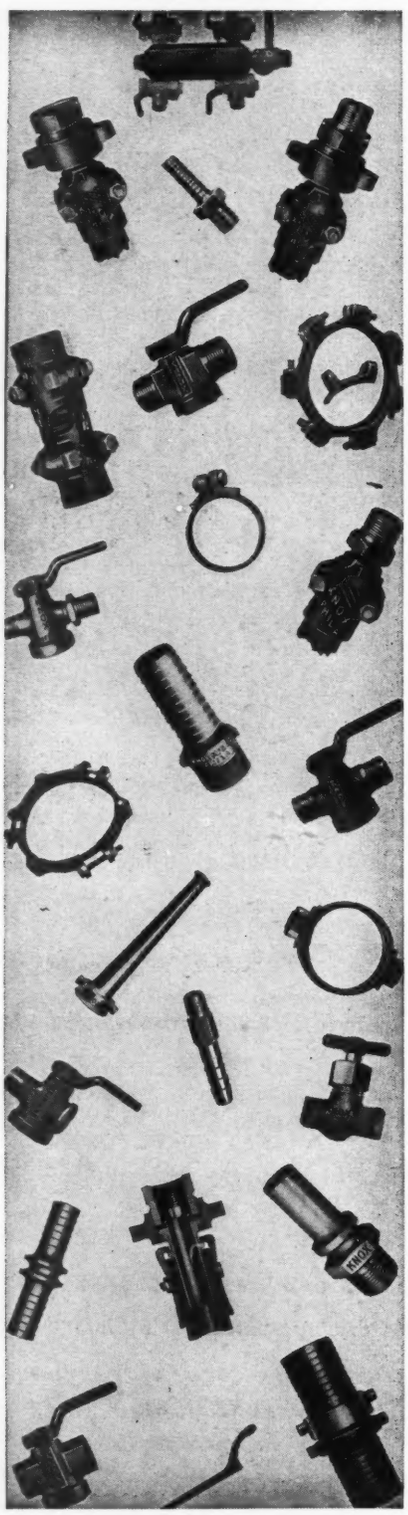

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SOUTH DAKOTA

★ Approximately 166,400 tons of bentonite were shipped from the Black Hills section of South Dakota in 1947. Reports come from three leading bentonite companies, whose total ore shipped is slightly below that of 1946. A fire destroyed the warehouse of the Baroid Co. which may have had an effect on the total ore sold. It is expected that 1948 production will be over 200,000 tons. South Dakota bentonite is used for a sealing agent in processes of industry, as well as for making insulation and insecticides and for cosmetics. A new, million-dollar plant being constructed by Baroid near Belle Fourche will be finished this spring.

IRON COUNTRY

Hawkins mine converts to truck, belt-conveyor operation — Montreal Mining Co. creates scholarship.

★ Because of water shortage at Cliffs Power & Light Co.'s plant, the Cleveland Cliffs Iron Co. has transferred some men from the day shift to the afternoon shift at the Mather, Cliffs and Cambria-Jackson shafts to relieve the heavy demand for power during the day time hours.

★ Herman Holmes, contractor of Crystal Falls, Mich., is driving a 28 by 30-ft. concrete-lined tunnel 2,660 ft. long, for the Penn. R. R. Co., near Pittsburgh, Pa.

★ Pickands, Mather & Co. is doing exploratory drilling west of the Homer mine and plans to do further drilling south of the Odgers mine at Crystal Falls, Mich.

★ The Montreal mine, Montreal, Wis., at the western end of the Gogebic range, was the top underground shipper of the Lake Superior district in 1947. It shipped a total of 1,248,011 tons.

★ North Range Mining Co. is sinking a new shaft at its Book iron mine, providing a second opening to the mine. The company has begun unwatering of the Champion mine, west of Ishpeming, which it leased from the Oliver Iron Mining Co. in 1947. It is pumping about 3,000 g. p. m. and expects to have the job completed in August of this year. Shaft timbers exposed by the pumping are found to be in good condition after having been under water for 38 years.

★ Michigan underground mines are ready with good sized stockpiles of ore to begin shipping as soon as the arrival of boats at the upper lake ports is announced. (Escanaba Harbor is practically open now.) The Buck mine of Pickands, Mather & Co. is in good condition to maintain its record as the biggest shipper of the Menominee range.

★ The Mather mine "B" shaft had reached a depth of 673 ft. on March 18. It will eventually reach about 3,000 ft.

★ The Montreal Mining Co., Montreal, Wis., has established a four-year scholarship in mining engineering at Michigan College of Mining and Technology, Dr. Grover C. Dillman, president of the college, announced. The proposal for the scholarship came from Crispen Oglebay, vice president of Oglebay, Norton & Co. Beneficiaries of the scholarship must come from Gogebic County, Michigan, or Iron Country, Wis. They must be sons of employees or of former employees who have died, become totally disabled or retired while in the company's employ.

★ The Michigan conservation department will make its sixth offering since 1946 of leases of State lands for iron ore exploration and development on April 16 at the County court house at Crystal Falls. Lands being offered consist of 6,160 acres in four townships, mostly west of Crystal Falls. Leases are given to those offering the largest bonus and provide for a rental of 10 c. per acre per year, and royalties if commercial orebodies are located. They are drawn for 50 years.

★ C. W. Moore of Duluth has discontinued stripping operations at the Forsyth mine east of Kinney until the opening of the ore season.

★ Republic Steel Corporation has purchased an underground iron ore property in Mexico, about 95 miles west of Vera Cruz.

★ The Minnesota Geological Survey will resume its geological survey work about May 1 in parts of St. Louis and Itasca Counties, it was announced by Dr. George M. Schwartz, University of Minnesota, at a meeting of the State Economic Development Council.

★ Steep Rock Iron Mine, Ontario, is planning to install a 3,000 ft. belt-conveyor to be in operation for the 1949 ore season. The company has purchased twelve 20-ton Euclid trucks of which eight have been delivered.

★ The Charleson Iron Mining Co. of Hibbing has leased the large stockpile of lean ore at the Missabe Mountain mine, Va., and is planning a plant to treat it.

★ The Hawkins open pit mine at Nashwauk, Minn., was for many years the main producer of the International Harvester Co.'s iron mining branch. It is now being operated by the Cleveland Cliffs Iron Co. and that company is converting the property to a truck, belt-conveyor operation. Steam locomotives and trains will be displaced in the pits by trucks. Trains, however, will continue to haul the ore from the conveyor to the washing plant, two miles away.

★ Great Northern Iron Ore Properties shipped 9,250,648 tons of ore from its royalty mines in 1947. The Mahoning mine of Pickands, Mather & Co. with 2,392,768 tons and the Hill-Annex (Inter-State Iron Co.), which shipped 1,645,851 tons, accounted for almost 44 per cent of the total.

★ The big tailings pond of the Hill-Annex mine at Calumet, Minn., is now being systematically sampled. Tests on the samples will be made at the new Jones & Laughlin research laboratory at Negaunee, Mich. There are millions of tons of tailings in the basin. Sampling will determine how much of it is susceptible to retreatment.

★ The new dragline-belt-conveyor stripping equipment at Butler Brothers' South Agnew mine at Hibbing is ready for operation. Meanwhile, dirt removal by standard shovels and trucks has advanced steadily. At the northwest corner of the property where the overburden was lightest, signs of the old underground workings have been encountered. The original orebody in this area went up to a point considerably above the elevation of the main body and was first to be mined underground.

★ The Inter-State Iron Co. is structure drilling its Lind property near Grand Rapids, Minn., while the engineering department is establishing property lines and sectioning the Prairie River on the west side of the property. Minnesota State engineers have been cooperating in the river sectioning because of the State's interest in any possible ore under it.

★ The Cleveland Cliffs Iron Co. has had a busy winter with stripping operations carried on at the Canisteo mine, Coleraine; the Holman at Taconite and the Atkins at Kinney.

★ The opening of navigation on the Great Lakes will see two of the Interstate Steamship Co.'s fleet—the James Laughlin and the Thomas Walters—with newly installed radar equipment.

MICHIGAN

Quincy treats lower grade sands —Calumet and Hecla continue diamond drilling

★ At the Quincy Mining Co.'s reclamation plant at Mason, nearly all of the better grade copper sands have now been treated. In the future the company must depend on the lower grade tailings, and profits will depend on the price of copper, as well as the cost of labor and supplies. The lower grade sands average 4.20 lb. of copper per ton treated. Under present conditions, a good profit can be made. The debt to the Reconstruction Finance Corporation for the construction of the plant during the war years was finally liquidated last year. The company's income during the year was $414,113.75 and the balance after operating costs and payment to RFC was $187,215.51. As a result of these profitable operations, the company declared a dividend of 25c. per share, payable April 30.

Quincy has produced 714,663,486 lbs. of copper and has paid $27,002,500 in dividends since its incorporation in 1848. The company owns 30,000 acres of mineral

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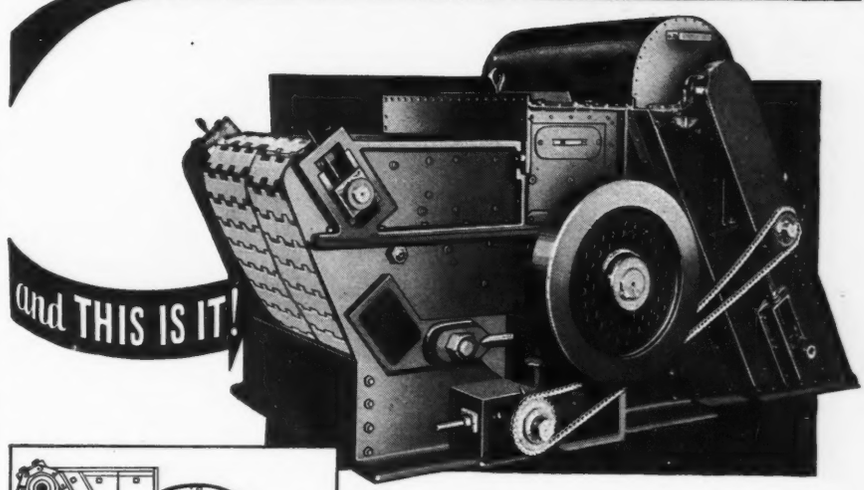

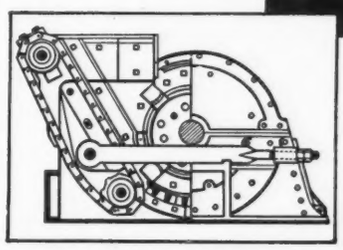

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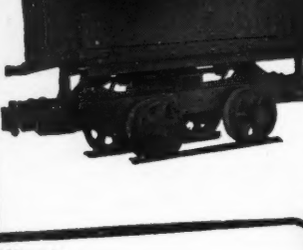

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MICHIGAN *(continued)*

lands. It is believed development work will be instituted at some future time and that Quincy again will be a primary producer. Diamond drilling of the company's lands has been in progress, and $8,365.06 was spent last year for this purpose.

★ The Isle Royale Copper Co., which produced 6,251,373 lbs. of copper in 1947, has in all 8 to 10 million lbs. of metal to extract from the remaining ground in No. 4 shaft and from shaft pillars before operations are stopped. Because of high costs and the expiration of the Premium Price Plan, no development work has been done since 1945. Ore reserves have been shrinking for several years, particularly so in the area tributary to No. 5 shaft. Some mining is being done in certain of the No. 5 shaft pillars, but when this is completed the shaft will be abandoned, leaving No. 4 the only source of production.

★ Calumet & Hecla is continuing its long-range diamond drilling program. Many long stretches remain to be drilled. Exploration is far from being complete, even between the Cliff and Delaware properties in Keweenaw County, where the company has concentrated its diamond drilling. In the area between the Allouez and Calumet conglomerates there are three zones of over a mile in length, and one of nearly three-quarters of a mile where no drilling has been done. These are the beds in which the Calumet conglomerate orebody occurred farther south. There are nine stretches averaging 3,500 ft. each in which there has been no drilling between the Calumet conglomerate and the Wolverine sandstone. It is in these beds that the Osceola and Kearsage amygdaloid deposits occurred farther south. In the drilling of the beds below the Wolverine sandstone, where the Isle Royale and Baltic lode ore occurred, and the beds above the Allouez conglomerate, where the Quincy deposits occurred, there are many gaps of a mile or more between drill holes.

The Calumet & Hecla company is also engaged in churn-drill explorations in the Wisconsin zinc-lead district, and in diamond-drill explorations in the Tonopah area in Nevada. The Calumet & Hecla copper smelter at Hubbell now employs 353 men, and is operating fire furnaces at capacity, treating mine ore, reclaimed minerals, scrap, cathodes and custom ore.

ILLINOIS–KENTUCKY

Inland Steel Co., Fluorspar Division, abandoned operations in the Illinois fluorspar district and offered all of its properties for sale. Operation of the Keystone mine near Salem, Ky., will be continued, with company headquarters at this mine. Paul E. Richards, superintendent, and four members of the staff personnel were transferred to Kentucky. Approximately 50 mine, mill, and office employes were released by the suspension.

TRI-STATE

Pumping discontinued at Oronogo — Tri-State Zinc, Inc., withdraws from district

★ Early in March a decision was reached to discontinue pumping operations at Oronogo and permit the mines in that area to become flooded, because of failure to provide Federal assistance to domestic marginal-ore producers, acording to Guy H. Waring, manager of the Oronogo Mutual Mining Co., which developed and mined the famous open-pit operation in Oronogo. Waring estimated the minable ore reserve of his own company at a half million tons or more. The Oronogo area is capable of producing some 15,000 tons of zinc concentrates and about 1,500 tons of lead concentrates annually under a price that will make operations profitable, Waring said. According to Frank Fenix of Joplin, former Missouri chief mine inspector, who is interested in other companies operating in the Oronogo area, approximately 150 men were employed in the Oronogo mining operations when the premiums were discontinued last summer and more than 200 were employed in peak production periods.

To sustain the pumping operations costs from $2,500 to $3,500 monthly, depending on the inflow. More than a decade ago, the Eagle-Picher Co. installed a number of pumps to unwater the area, which initially cost about $10,000 monthly to operate and beat the water. At the time of discontinuing pumping, the company was maintaining four large turbine pumps in the area, each with a 150-ft. head and a total capacity of around 5,000 gallons a minute. Waring pointed out that there are several million tons of low-grade ores in the Webb City sheet-ground formation above the roof in his present workings that will require a profitable price or incentive program to be minable. Under a long-term subsidy program, he pointed to greater ore reserves at deeper levels in the Oronogo and south Webb City-Carterville area.

★ M. H. Loveman, manager, Tri-State Zinc Inc., and Missouri Mining Co. has announced the termination of the two companies' operations in the Tri-State district and the liquidation of their local physical assets. Tri-State Zinc Inc., has disposed of its two tailings plant at Picher —the Ottawa to the Cardin Electric Co. and the General Steel Product Co., and the Sooner to the Sooner Milling Co., Inc., which is owned and is being operated chiefly by former employees. The Chitwood retreatment mill and other equipment of the Missouri Mining Co. has been sold to General Steel.. Tri-State Zinc has moved its offices from Joplin to Galena, Ill., where the company has taken several mining leases and is mining two zinc-lead orebodies.

★ The part played by advancements in underground mechanization toward sustaining production in the face of man-

power shortages during the war and the low tenor of minable Tri-State ores was emphasized by S. S. Clarke, general superintendent of mines for the Eagle-Picher Mining & Smelting Co., in a talk March 18 before the Southwest chapter, Missouri Society of Professional Engineers, and again before a meeting of the Tri-State section, American Institute of Mining and Metallurgical Engineers. Although there were many disappointments, Clarke pointed out that with cooperation of the company's mining staff and the able assistance of the miners themselves, they were enabled to perfect to practicable application the loader ramp, drill-mounted jumbo and battery trucks for haulage. By perfecting a detoxifying agent for diesel exhaust gases, the use of diesels underground for hauling has been one of the subsequent outstanding achievements.

"Plans now call for the construction of a mobile drill jumbo carrying a diesel or electric driven air compressor and combination loader and truck that will operate as a unit in the final cleanup of the mines when they reach the stage of pillar stabbing and brightspot shooting," Clarke concluded. Many of the underground developments in mechanization were illustrated by a sound film, entitled "Underground," prepared by Eagle Picher.

NORTH CAROLINA

State's stream pollution law ruled unconstitutional — Increased mica demand spurs feldspar operations

★ The N. C. State Supreme Court recently set aside a lower court decision convicting the Glidden Co. of stream pollution, thus upholding the contention of the defendant that the State's stream pollution law, enacted in 1915, is unconstitutional because it exempts corporations chartered before March 4, 1915, and discriminates against those chartered after that date.

In ruling out the law as contrary to the State's constitution, the Supreme Court said that "if the statute is upheld, we shall have the spectacle of one corporation doing things denounced and punishable as a crime, and another, side by side in the same stream, doing the same thing with impunity and approval of the law. The contention that the statute is offensive to the constitution in that without due process of law it deprives the defendant, or may deprive him or any other person, of property rights is not well taken. No matter how long the practice of polluting the waters by waste products from mining or manufacturing has been practiced, there is no prescription against the state when it sees fit to remedy the evil."

The latter statement was taken to give the next State Legislature, which meets in January 1949, a go-ahead signal should it wish to adopt a stream pollution law which is not unconstitutional.

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North Carolina *(continued)*

★ Operations to test machinery and equipment at the new plant of the Diamond Mica Co., Spruce Pine, are under way. Demand for mica, obtained as a byproduct from local feldspar production, has increased of late and has resulted in greater feldspar operations.

TENNESSEE

★ Victor Chemical Works has announced an expansion program at Mt. Pleasant involving an estimated expenditure of $1,750,000, to be completed not later than August. Work to increase the capacity of the electric furnace plant is already well under way. Victor, a producer of elemental phosphorus and phosphate chemicals, operates plants at Mt. Pleasant, Nashville, Chicago Heights, Ill., and Tarpon Springs, Fla.

ALASKA

Year's mineral production 15% up —Notices to be filed if claim owners exempted from assessment work

★ Total mineral production in the Territory reached $14,341,000 during 1947, a 15 per cent increase over the previous year, according to the U. S. Department of the Interior. The first zinc production came in 1947 from Big Four Mining Co.'s property south of Ketchikan. Gold production was nearly 3 million dollars over 1946 production. The value of silver was almost doubled over the previous year. Lode gold production continued low in 1947, the advance coming chiefly in placer operations. Platinum metals produced by Goodnews Bay Mining Co. were down about 40 per cent from 1946 figures.

★ U. S. Smelting, Refining & Mining Co. continued work through the winter at Cleary and Little Eldorado. Operations at Ester dredge started March 10, and a little later at Goldstream. Five of the company's dredges will operate this year according to I. D. Crawford, superintendent.

★ Operations at Chititu Mines, on Chititu Creek, in the McCarthy district, have started, with a crew of about eight under Charles H. Kraemer. The property is owned by the J. E. Andrus estate, in New York.

★ Another Flin Flon prospector has applied to the Saskatchewan government to develop what is believed to be a diamond occurrence.

★ Notices of desire to hold mining claims are to be filed in the U. S. Commissioner's office for the recording precinct in which the claims are located if owners are to be exempted from performing assessment work during the year ending July 1, 1948, B. D. Stewart, Commissioner of Mines in the Territory, reports. If a new exemption law is not passed by July 1, annual labor will again be required to be completed by July 1, 1949.

★ Mining activity has resumed near Marshall, where Alex Mengell and A. Guiak are doing diamond drilling on placer claims, P. McDermott and E. Johnson are drilling on Edgar Creek, and Willow Creek Mining Co. is employing 14 men on dragline work on Willow Creek.

★ According to R. L. Graff ,president of McGinnis Creek Mining Co., about 15 men will be employed this spring at the McGinnis Creek Basin property, consisting of 14 claims adjoining the Mansfield property, and building and road construction will begin. Jack Whitfield is vice president. Offices of the company are at Juneau.

★ Some high-grade antimony ore is located in central Alaska, according to the U. S. Bureau of Mines, but operations would be expensive and difficult. Investigations were made in the Kantishna district during the war. Ore from Slate Creek area contained as much as 18.7 per cent antimony, but of 220 tons treated the average content was 9 per cent. Black Mountain, Black Rapids, Caamano Point, My Creek, Ridge Clair, Tok River, and Wiseman deposits were investigated.

★ Supplies have been taken from Ophir to Colorado Creek where Goodnews Bay Mining Co. will operate, according to Fred Johnston, who will be in charge.

★ Keno Hill Mining Co. is employing about 80 men in mining operations, and about the same number in mill operations at the Elsa and in maintenance work. One hundred tons a day are going through the 150-ton mill and more than 500 tons of concentrates are reaching the water at Mayo each month, according to A. W. Johnston, consulting engineer, and H. D. Dicks, manager of the company.

★ A statement from Ottawa that private prospecting and development of radioactive ores will now be allowed "is good news," according to officials of the British Columbia and Yukon Chamber of Mines. The guarantee of the Canadian Government to buy all uranium ore and concentrates produced for the next five years will encourage prospecting. "Individuals won't be faced with the expense of putting up a mill. All they will have to do is mine the ore and sell it."

★ C. E. McLeod, secretary-treasurer of Yukon Consolidated Gold Corporation, Ltd., at Dawson, has become general manager of the company, replacing W. H. S. McFarland who will be consulting engineer. The company expects to operate eight camps this season. Because of expenditures of $383,819 for increasing its stripped and thawed resources, the company showed a loss of $221,900 in 1947. Yukon had about 70 men working early this season but expected to add about 70 a week until about 550 men are employed. Work on two dredges started in March, and repair work on others was to start early in April.

★ J. M. Easson and D. R. Perry, of Western Range Prospecting Syndicate, are managing work at the newly discovered silver-lead-zinc property near the Alcan Highway and Canol pipeline, in the Yukon. It is reported that Conwest, Frobisher and other Canadian companies are connected with this enterprise.

CANADA

Silbak Premier reports net loss —Jeep Gold Mine discloses development work

ONTARIO

★ Specially trained crews fitted with oxygen apparatus extinguished a fire half a mile underground at the Sylvanite gold mine in Kirkland Lake. The fire was confined to a vertical passage between the 2500 and 2700 levels and no damage was done. Sylvanite lies between the eastern workings of the Wright-Hargreaves mine and the Toburn mine, and men at Wright-Hargreaves were laid off briefly when smoke spread from the Sylvanite.

MANITOBA

★ J. D. Perrin, president, San Antonio Gold Mines, Ltd., in the annual report for the year ending December 31, 1947, stated that from July until November the company experienced the "most difficult period in the history of the mine." Since then the situation has improved. At one time there were less than 40 men employed underground. Despite this difficulty a total of 137,867 tons of ore was milled from which was recovered 42,143 oz. of gold as compared with 149,875 tons and 43,819 oz. of gold the previous year. Ore reserves are shown as 700,000 tons, of which 105,000 tons are broken.

Development projects completed include preparatory work for the No. 4 winze, or internal shaft, which will be carried to the 26th level ,or approximately 4,000 ft. below surface. Although other development work was reduced in order to expedite shaft sinking, a total of 3,132 ft. of development was completed. New ore classified as "A" was developed for a length of 915 ft. with an average width of 6 ft. and a grade of 0.36 oz. of gold per ton. "B" or low grade ore showed a length of 448 ft. over a width of 4 ft. Development diamond drilling totaled 9,346 ft.

Mine operating costs were $6.69 per ton, of which $1.82 is a charge to development. Of the total development cost $1.31 is chargeable to the No. 4 winze. The operating cost per ounce of gold was $21.90. Gross production for the year was $1,479,666. Operating profit ,before depreciation and taxes, amounted to $510,572. Net profit after all charges was $326,099.

★ The Jeep Gold Mine, Ltd., report of operations for 1947 discloses the following development work for the year; shaft sink-

ing 218 ft., first level station 5,077 cu. ft., drifting and crosscutting 1,219 ft., underground diamond drilling 222 ft., surface diamond drilling 6,906 ft. A diesel-electric plant has been installed and all equipment is operated by electric power. During the summer a vein known as No. 3 was discovered roughly parallel and some 600 ft. from the No. 1 vein. Following this discovery it was decided to establish the first level at 2000 ft. horizon and from this point to develop both veins.

Although an accurate estimate of ore tonnages is impossible at the present, it is stated that "It is safe to assume that in the No. 1 vein alone and above first level, there exists 6,500 tons with a minimum grade of 2 oz. per ton". It is planned, during the present year, to sink the shaft at least one more level and start production on a small tonnage basis.

★ Hudson Bay Mining and Smelting Co., Ltd., discloses that for the year ending December 31, 1947, a total of 1,855,035 tons of ore was mined and milled. Production of refined metals was 82,301,298 lb. of copper, 105,794,839 lb. of zinc, 120,678 oz. of gold, and 1,580,268 oz. of silver. The gross income for the year was $35,048,488, resulting after deduction of all charges in a net profit of $12,509,463. This profit is equivalent to a share earning of $4.54 as compared with $3.21 for the previous year.

Ore reserves as of January 1, 1948, are estimated at 22,700,000 tons averaging 0.084 oz. of gold, 1.20 oz. of silver, 3.0% copper and 4.3% zinc. The previous estimate of ore reserves as of January 1, 1946, was 26,000,000 tons averaging 0.089 oz. of gold, 1.25 oz. of silver, 2.99% copper and 4.3% zinc. The decline in ore reserves is attributable to the inability of the company to perform adequate development work.

SASKATCHEWAN

★J. L. Phelps, resources minister, announced recently that up to 40 prospectors will be assisted to carry on work in the Precambrian areas of Saskatchewan this year. Air transportation will be provided, and all equipment with the exception of pack sacks, bed roll, and food supplies, will be loaned by the provincial government. Cash awards will be made for discoveries on the basis of 2.5% of the amount expended on diamond drill and underground development during the three year period starting from January 1 after the date of discovery. Fees for miners' licenses, transfers and assessment tax will be waived on claims staked for a three year period. Assay samples will be picked up twice during the field season, at which time government geologists will spend several days with each party.

★ Uranium ore is reported to have been discovered on group claims situated approximatel 30 miles from Flin Flon just inside the Saskatchewan boundary. The presence of radioactive material has been checked by two representatives of the National Research Council. The claims were staked two years ago as a potential nickel-copper deposit.

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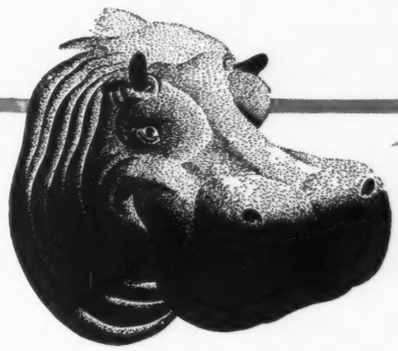

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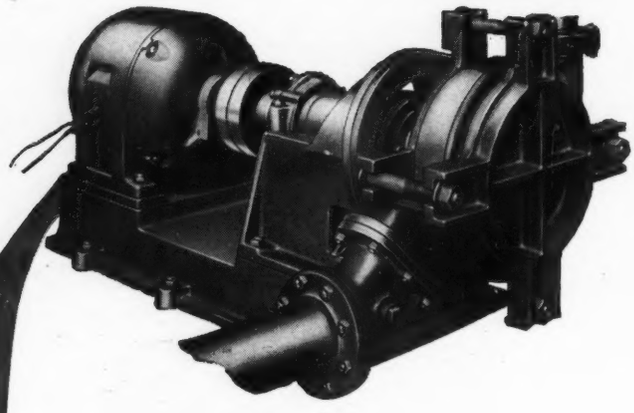

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BRITISH COLUMBIA

★ Halport Mines, Ltd., has been incorporated with capitalization of 3 million shares of no par value to acquire and develop a group of gold-silver claims in the Portland Canal mining division. Surface stripping and open-cutting on the property last year showed one vein extending over 850 ft. with assays of 0.40 oz. gold and 1.5 oz. silver over an indicated width of 5.5 ft. for this length. On other veins disclosed in this work, assays were frequently as high as 1.25 gold per ton. The program for 1948 includes 5,000 ft. of diamond drilling.

★ A net loss of $186,530 during the fiscal year ended December 31, 1947 was reported by Silbak Premier Mines, Ltd., pioneer operator in the Portland Canal mining division and British Columbia's greatest gold producer. Labor difficulties, rising costs, and the necessity for extensive development all contributed to the adverse situation. Production during the year was 4,963 tons of concentrates, yielding 2,314,469 lb. of lead, 69,304 oz. silver, and 12,232 oz. gold for a total value of $759,909. After marketing expense of $132,630, net smelter value was $627,279. With operating costs for the year at $818,293, net loss for the period was equivalent to $3.22 per ton mined. The company's deficit at December 31 showed $1,833,622. Ore reserves as estimated at the end of the fiscal period were 58,810 tons of broken and unbroken material assaying 0.24 oz. gold, 2.47 oz. silver, and 1.85% lead per ton. This estimate does not include zinc content which will be recovered during 1948.

Installation of a zinc circuit in the mill is expected to materially increase total production revenue. To cut operating costs, the Silbak Premier company is abandoning the old aerial tramline and will haul concentrates from the mill to the beach by truck at an estimated one-fifth of the previous cost.

While the famous Premier mine has produced more gold than any other mine in British Columbia, it is not able to qualify as a gold mine under terms of the federal government's legislation to assist Canadian gold producers. Silbak Premier revenue is derived 60% from gold, 10% from silver and 30% from lead. Consequently the management is compelled to take every possible step to cut operating costs to a minimum in an effort to break even. Labor demands for a wage increase of $2.80 per day have been refused and the company has stated that if the employees persist the company will have no option other than to suspend operations. With a reasonable attitude on the part of the company's employees, however, the company hopes to be able to at least break even during the ensuing year.

★ Arangements for erection and installation of a 125-175 ton milling plant on the Texada Island property of the Vananda Mines (1948), Ltd., have now been completed. Management of the property is under direction of Sheep Creek Gold Mines, Ltd.

★ The balance sheet of Bralorne Mines, Ltd., for the fiscal year ended December 31, 1947, shows current assets of $920,679, including cash, $470,975, and bullion and concentrate, $261,372, as against current liabilities of $247,876, including reserve for income taxes of $90,310. During the year, revenue from production was $2,143,551. Cost of production was $1,242,502; shipping expense, $50,097; and cost of community welfare services, $94,490. Gross profit before depletion and depreciation was $756,463, and net profit after expenses, taxes, etc., but before depletion allowance, was $335,633.

Austin C. Taylor, Bralorne president, has advised shareholders that "The operating cost of producing an ounce of gold has risen from $11.50 in 1939 to $23.50 in 1947. Contributing factors were the small tonnage milled and the shortage of manpower. Increased costs without a compensating advance in the price of gold also affected the value of the ore. A higher grade must be mined to meet such costs, and what was low-grade but profitable ore became marginal. However, the mine is in good physical condition and the over-all ore reserve position is excellent."

★ North American Goldfields, Ltd., has shipped 11 cars of machinery and equipment, including a large dragline shovel, to the company's placer holdings at French Flat on the Quesnel River near Quesnel, B. C .Glenville A. Collins, managing director, states that testing has shown 3 million cu. yd. of gravel averaging 20c., and a highgrade section of 300,000 cu. yd. averaging 80c.

★ First dividend of 6% has been declared by Atkinson Dredging Co., Ltd., on outstanding preferred shares. A payment to holders of common stock is planned for later in the year. Good results have been obtained during the first two months of dredging on the Similkameen River near Princeton, B. C. The company has purchased a second tractor and bulldozer to assist in moving boulders in the path of the dragline.

★ Although shareholders of Dentonia Mines, Ltd., near Greenwood, B. C. were advised at the last annual meeting that ore reserves were estimated at 31,000 tons grading $15 per ton in gold, and mill efficiency at the operation was reported as good, the mine has now been closed and it is announced the company will seek voluntary liquidation. During the four months that the new milling plant was in operation, mill heads at no time approached expectations, apparently indicating a serious discrepancy between sampling and production resutls.

Correction:

In the January issue of *E&MJ* it was stated that Mina Pirquitas (Picchetti y Cia.), the only important tin producer in Argentina, was closing down. This was in error; the company has only curtailed operations, and continues to produce tin and silver from the vein deposit, and tin from the placer, on a diminished basis.

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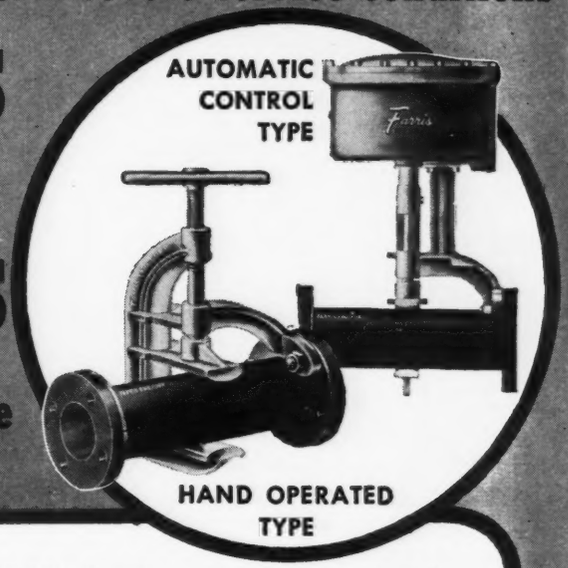

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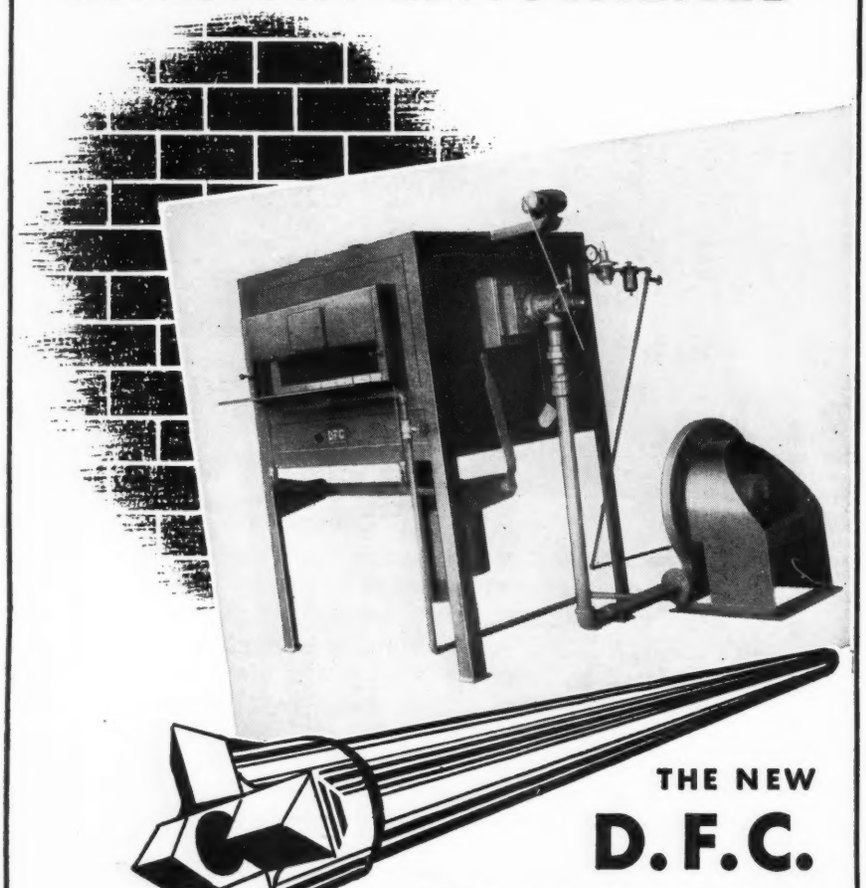

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MEXICO

Mining meeting calls for end to production tax, asks better transportation—Strike shuts lead mines

★About 350 delegates from mining companies, large and small, from mining cooperatives, and from Government agencies interested in mining, gathered in the Palace of Fine Arts, Mexico City, from March 8 to 13 to discuss the many problems of the mining industry of Mexico. Both labor representatives and labor problems were excluded from the talks at the request of the Ministry of National Economy Antonio Ruiz Galindo, secretary. Most urgent of the reforms called for by the delegates were relief from heavy taxation and measures for improving Mexico's transportation system.

Gustavo P. Serrano, president of the Mexican Mining Association, said, in one of the leading speeches, "We all agree that the ideal condition would be to have Mexico's mineral resources exploited by Mexican capital. But we must face the fact that either Mexican capital is insufficient to undertake large-scale mining exploitation, or Mexican capital is unwilling to take the risk involved in mining when it offers such small recompense."

Sr. Serrano warned that continuance of the production tax, which is a straight tax on gross production, not on net, has had the effect of forcing mining companies to mine their high-grade ores even in these times when the prices of metals are so high. The prudent course ,and the one which would also most benefit the country, would be to mine the low-grade ores when metal prices were high, and save the richer ores to be mined when prices were down. Under the present system of taxation, high grade ores are being mined out and mines will have no alternative but to close down if prices drop, Sr. Serrano added.

Many complaints were heard about Mexico's faulty transportation system, and it was reported that bottlenecks of various sorts including rake-offs demanded by station agents, have tied up in the Mexican railway system about 150,000 tons of ore for a value of 28 million pesos. Both the Government and the railroad company have promised to remedy this situation. The railroad was directed by the Government to buy 1,000 ore cars in the United States as soon as possible.

A rumor going the rounds of the meeting that the Government planned to take over, perhaps permanently, strike-bound metal mines, was spiked by an official announcement that no such action was contemplated.

Strikes continued early in April against the major units of Mexico's lead producing industry: Santa Barbara, Parral, San Francisco Mines of Mexico, and others. At the time of writing, no prospect of an early settlement was seen. Strikes at Fresnillo, Avalos, and Monterrey were averted

or settled after a two-week shutdown by wage increases of 18 to 20%, plus other economic benefits. The strike at Real del Monte y Pachuca, which was bought recently by the Mexican Government from U. S. Smelting, ended at once when the Government, through the Labor Ministry, declared the strike illegal. This meant that the strikers would be not entitled to any strike benefits or legal protection, and the men went back to work the next day.

AUSTRALIA

Bureau of Natural Resources report may outline new gold policy —Gold profit cut by rising costs

WESTERN AUSTRALIA

★Gold production in Western Australia, for 1947, was 703,886 fine oz. This compares with 616,964 fine oz. in 1946, and 463,521 fine oz. in 1945. Recovery continues to be slow, and production is still far below the prewar 1,100,000 fine oz. The chief reason for this slow recovery is the shortage of labor, which can be attributed to the attractions of other industries.

★The recent award by the Arbitration Court, while not granting the demands of the unions, gives substantial concessions, which provide for a 40-hour week for surface workers, and a 37½-hour week underground . There is an additional 5% allowed for one night shift and an increase of nearly 50% in margins for skill. Workers in continuous processes are restored to a six day week, but Sunday work in such processes must be paid time and a half. Workers will receive three weeks' holiday at full pay. In Victoria, in addition to paid holidays of three weeks' duration, there are also ten paid statutory public holidays, so that mine employees actually receive payment for five weeks holiday, in addition to provision for sick leave, cumulative over a period of two years. These factors will necessitate drastic recalculation of ore reserves and the elimination of large tonnage of lower grade ore, with the resultant shortening of the life of a number of mines. This aspect apparently does not weigh with the unions, since there are already expressions of discontent with the terms of the award.

★More than one important mine has seen its profit margin crumble away under the impact of steeply rising costs. Big Bell, one of the state's two big units, has been producing gold at £11/9/9 an oz., for which it receives £10/15/3. The average production cost for all mines has risen by £2/16/10 an oz. since 1936, bringing the average cost to £9/1/5. This average does not apply to marginal mines with higher cost factors while, conversely, some of the better mines operate at a reasonable profit. This explains in part why dividends from gold mining in the state

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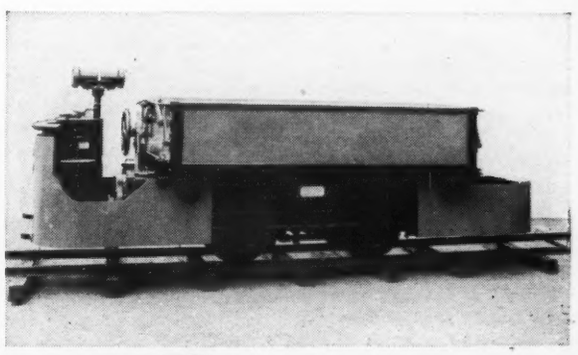

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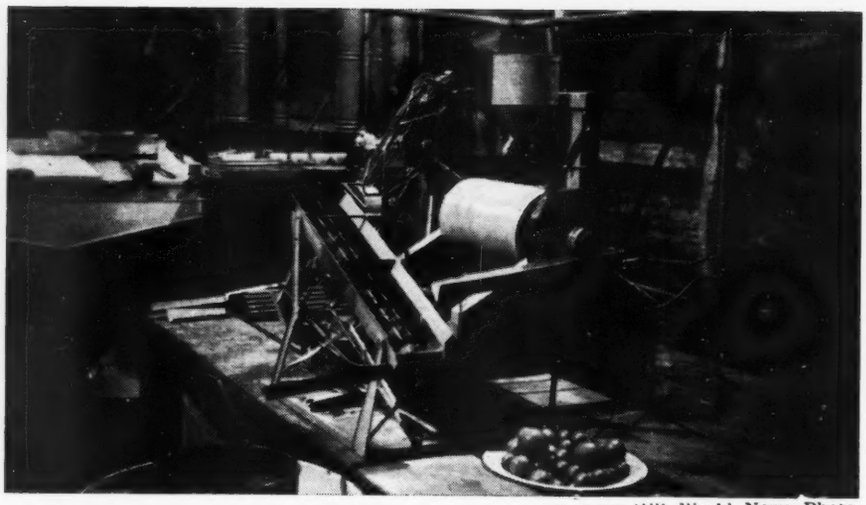
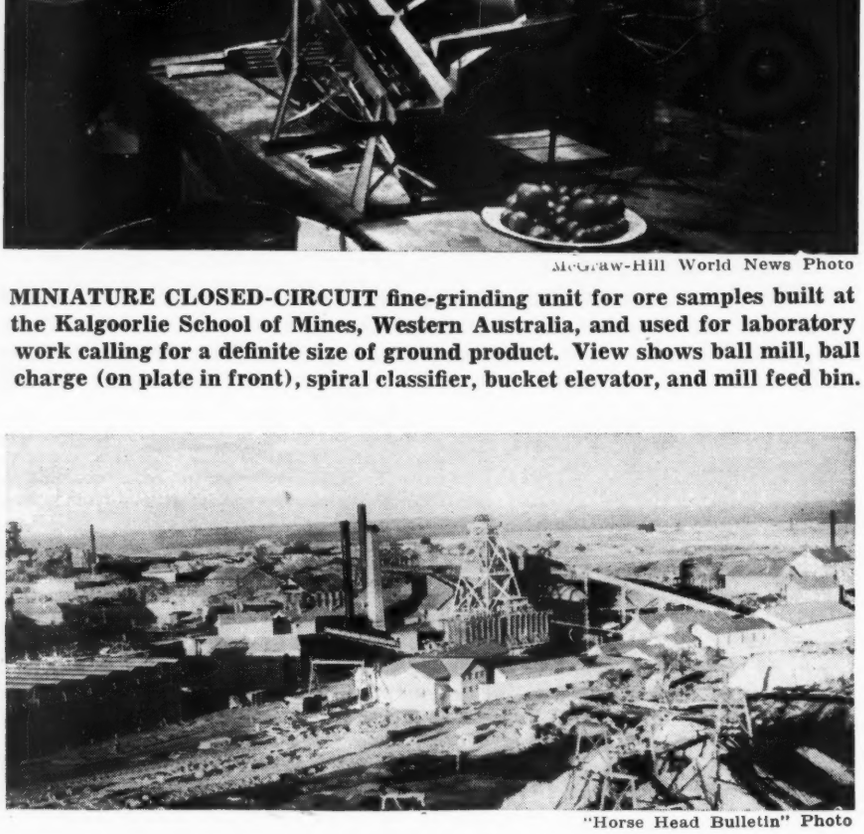


McGraw-Hill World News Photo

MINIATURE CLOSED-CIRCUIT fine-grinding unit for ore samples built at the Kalgoorlie School of Mines, Western Australia, and used for laboratory work calling for a definite size of ground product. View shows ball mill, ball charge (on plate in front), spiral classifier, bucket elevator, and mill feed bin.



"Horse Head Bulletin" Photo

MINING OPERATIONS on part of Australia's "Golden Mile" near the twin cities of Kalgoorlie and Boulder, Western Australia.

WESTERN AUSTRALIA *(Cont.)*

totaled £894,085 in 1947, £180,159 more than in 1946. This represented roughly 6% of the capital invested in the industry. The increase was due to resumption of operations by several big units following the war.

★Norseman Gold Mines has suspended its exploration program but is keeping the mine dewatered for resumption when conditions are more propitious. Emu, one of the best mines outside the Golden Mile, is threatened with closure by high costs and lack of finance. The mine is controlled by Murchison Gold Development, of the de Bernales group. Emu's accounts are in the hands of the Official Receiver in London.

★It is doubtful whether the Commonwealth will at the present risk an involvement with the International Monetary Fund by deciding on an outright subsidy policy to keep marginal mines in existence. Any major move is likely to be postponed until final decisions have been made in London on the sterling-dollar exchange rate. Indirect subsidies through supply of services such as water, power, freight, and ore treatment, would appear to be the most likely forms of assistance to marginal mines.

★New Coolgardie Gold Mines has acquired four leases on Hampton Areas' Block 59 for £50,000. The purchase gives New Coolgardie an unbroken mile of gold-bearing country for development of a first-class mine. The previous operators last year lost £8,000 on the lease.

★During trial runs from Nov. 28 to Jan. 21, Meekatharra Sands Treatment & Mining, N. L., treated 11,250 tons of residues with its newly installed plant. Recovery was 330.39 oz. of 6/3 ($1) worth of gold per ton. A 35% increase in recovery was recorded in the fortnight following the first trial run. Directors report that the low extraction was caused by insufficient aeration, which was overcome by installing a larger compressor.

NORTHERN TERRITORY

★Mining in this part of Australia is making slow progress as a result of the labor position and a feeling of apathy amongst investors due to the remoteness of the mining fields. Tennant Creek continues to be the most active center. Although the field was idle through the war years, production from the area has been approximately 250,000 tons of ore yielding an average gold recovery of 18 dwt. per ton.

The largest mine, the Eldorado, has reached a depth of only 300 ft. and in the past year has milled ore giving a recovery of 17.28 dwt. per ton, tailings assaying 7.53 dwt. per ton. The Mount Todd mine has nearly completed equipping and production is expected to start soon. Mica mining has been disappointing in spite of rich occurrences, which contain a large proportion of high grade sheet. Efforts at systematic mining under company control have not proved successful.

SOUTH AUSTRALIA

★Australian Industrial Minerals, N. L., of Adelaide, is actively developing the Mount Crawford deposits of sillimanite located 23 miles north of Adelaide. Reserves are estimated at 100,000 tons, of which 10,000 tons are sillimanite and the remainder dickite. Sillimanite is the only refractory material produced in the Commonwealth. Production rose conspicuously during the war and some shipments were made to the U. S. An appreciable export trade has developed since the war. The smelters at Port Pirie provide the only Australian outlet for the mineral.

QUEENSLAND

★The *Queensland Governmental Mining Journal*, official organ of the Department of Mines, has taken the unusual step of criticizing the Canberra price policies which have brought about the vast discrepancy between the current fixed maximum Australian metal prices and quotations overseas.

Since producers are obliged to supply Australian consumers at Australian prices, the benefit of higher overseas prices is only reaped by them when surpluses are available for export. In the case of tin and copper, where Australian consumption exceeds production, no metal is exported and producers receive £133 15s. and £35 respectively less per ton than the Australian equivalent of world parity.

The Journal states that copper and tin producers are most affected by the price control system. Queensland is vitally interested in giving incentive to tin production because the largest individual producer (Tableland Tin Dredging, N. L.) is operating in the state. The editorial points out the potentialities of the Mount Garnet area as a tin-producing region.

The Journal also criticizes the present system of taxation on base metals as not conducive to the expansion of the industry. Base metal mining is taxed practically as heavily as general industries without regard to the wasting nature of mine assets. A recognition of this principle would give much impetus to mining, as Canadian experience has shown.

★The net profit of Mount Isa Mines, Ltd., for the year ended June 30, 1947, reached £502,585. These earnings were derived from lead-silver-zinc operations for the

first time since 1942. The intervening period has been devoted mainly or exclusively to copper production, but this was suspended in April, 1946. Full benefit of high overseas prices could not be realized because of railway transport difficulties preventing shipment of about half the zinc concentrates produced.

Faced with a severe increase in operating costs because of the introduction of the 40-hour week on Jan. 1 this year, and an application by the unions for a sharp increase in the lead bonus, the company feels that the effect of these two items must be appraised before determining future dividend policy. Because of the manpower shortage the mine is unable to make up for the shorter working week by hiring more miners, and is compelled to pay overtime to get the same output. As a gesture to employees, Mount Isa recently sold them 33,000 £1 shares at par, quoted above £2 on the markets.

The reserves of developed and prospective silver-lead-zinc ore show an increase to 9,997,962 tons, containing an average of 6.3 oz. of silver, 8.6% lead and 7.5% zinc per ton. A small portion of this is lower grade carbonate ore. Due to the complex nature of Mount Isa ores, milling efficiency is low. Copper reserves are 2,864,030 tons of 4.02% sulphide, and 58,700 tons of 7.9% oxide.

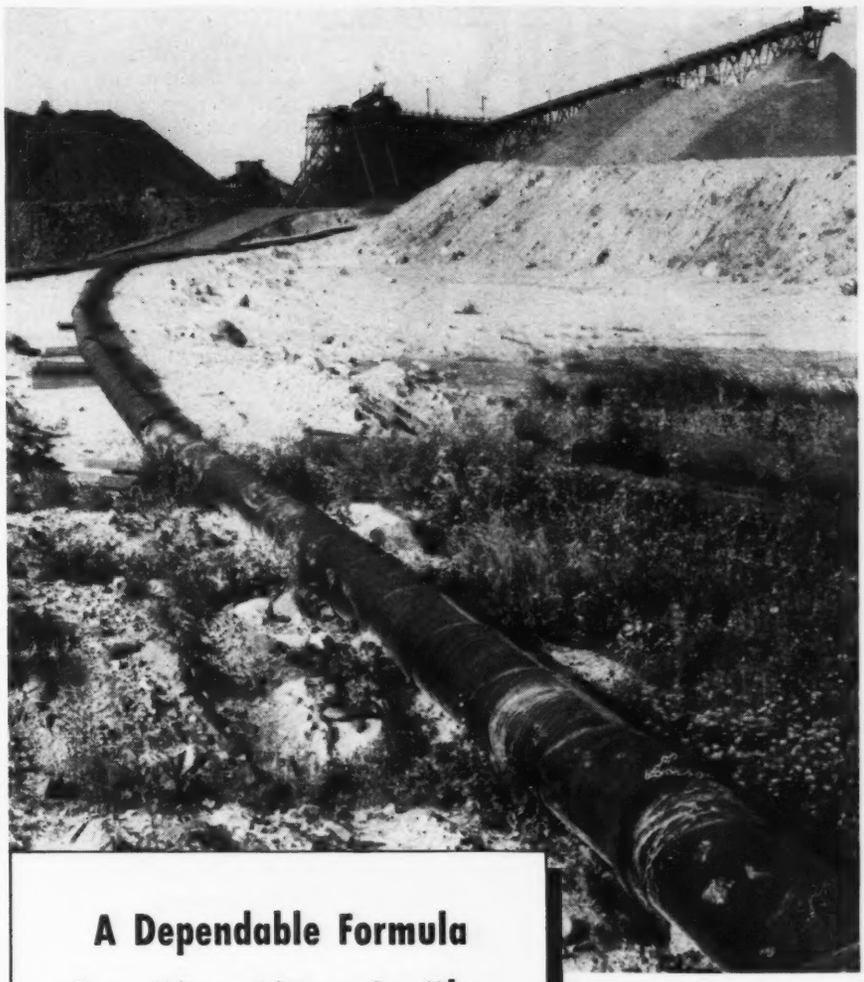
Construction of the new £1,000,000 copper plant is being held up because of shortages of materials and manpower. Little or no construction has got under way on the mill and smelter sections.

Production for the year was: silver, 1,835,514 oz.: lead, 25,095 tons; copper, 332 tons; zinc, 21,518 tons; copper, 12,249 tons. Operating costs were: Mining and development, 17.237 s/ton; milling, 8.081 s/ton; smelting, 12.040 s/ton; administration, 3.794 s/ton; railage, handling charges, etc., 3.153 s/ton; a total of 44.305 s/ton.

Development work totaled 3,695 ft., with 7,890 ft. of diamond drilling. Blast hole diamond drilling amounted to 81,708 ft. The mill treated 446,110 tons of ore. Lead concentrate produced amounted to 69,848 tons, and zinc concentrate amounted to 42,375 tons. Recoveries were: silver 72.9%; lead, 74.5%; zinc, 53.0%. Average number of men employed was 1,025.

TASMANIA

★Renison Associated Tin Mines has continued operations on a limited scale in proportion to the potentialities of the ore occurrences. The property contains shallow reserves of some 750,000 tons of pyritic ore containing cassiterite, the greater part of it being minable by open-cut methods. Grade of the ore is 0.8% tin. Output of ore during the last period of 12 months was 11,998 tons, assaying at 1.06% tin. Recovery was 109 tons of concentrate having a metallic content of 75.765 tons of tin. Overall mill recovery was 59.6%. Low recovery is due to the very fine grain size of the cassiterite, and the deficiency of the mill in slime saving appliances. Ore, after grinding, is passed through a flotation section for removal of the pyrite and



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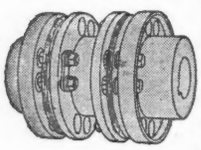

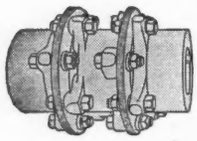

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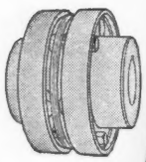

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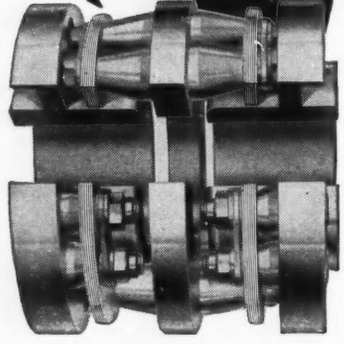

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TASMANIA *(Continued)*

pyrrhotite, which constitute about 70% of the bulk, and the flotation tailings are concentrated on tables, vanners, and rotary tables. Operating costs were: Mining, 10s 1.80d.; transport, mine to mill, 1s. 2.92d.; treatment, 8s. 6.86d.; maintenance, 3s. 11.88d.; mine overhead, 5s. 2.64d.; power and light, 2s. 0.59d.; total cost per ton, 31s. 2.69d.

★Aberfoyle Tin, N. L., is a producer of lode tin. In the last financial year the mine produced 27,829 tons of ore from which were recovered 441 tons of tin concentrate and 67 tons of wolfram concentrate. Ore reserves are estimated at 127,996 tons of proved ore and 13,152 tons of probable ore. The greatest continuous length of any one lode is 800 ft. The width of the orebodies increased from a few inches to 4 ft., the average being 20 in.

VICTORIA

★To encourage gold production, the state government has increased financial help to the industry by 80%. Most important assistance to mining companies comes in the form of advances of a £1 for £1 basis, free of interest, for approved development projects.

★The Department of Mines has ordered a portable crushing battery for economical testing of ore at experimental mines. A portable drilling plant has been ordered in the U. S. which will be made available by the department.

PHILIPPINES

Rehabilitation looks easy at Batong-Buhay—Surigao ore improves—Lepanto to start new mill in May

★Work at the Taysan gold mine, newest gold producer in the Philippines, has been progressing satisfactorily in spite of some labor trouble, arising from bringing in skilled miners from Baguio to take the place of local men. Ralph Hanson is in charge of the property.

★Inspection of the Batong-Buhay property in northern Luzon discloses that the surface plant is in comparatively good shape considering the long time it has been idle. The adit on the 1,230 level has been repaired sufficiently to reach the interior shaft. This latter is flooded to within 100 ft. of the collar. The mill is in satisfactory condition, although some repairs will be needed. The road from Libuagaan has been repaired to within 10 km. of the mine. Rehabilitation of the property does not present a very difficult problem.

★Development of the chromite deposits in Oriental Misamis province, in South central Mindanao is speeding ahead. Soriano interests are in control, and Harvey Weidman is in charge.

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★Panaminas, Inc., a subsidiary of Ventures, Ltd., has taken over the interests of Elizalde & Co. in southern Mindanao, where before the war the latter operated the Davao gold mine. Additional ground has been acquired in that area.

★Company engineers have been occupied in purchase and transportation of equipment to the Acoje chromite deposit in Zambales, which had a large output of metallurgical grade chromite before the war. Production is expected soon.

★Mindanao Mother Lode reported January production of $89,600 from 3,400 tons milled, and $124,000 from 5,600 tons in February. The mill is expected to operate at capacity in March or April, with full production from all levels.

★Surigao Consolidated is now milling better ore from the 300 level and will shortly be stoping from the 400, which is unwatered and being prepared for mining. Production was low in the first quarter of the year, as mill feed came chiefly from cleanup work and the surface pit.

★Lepanto Consolidated is scheduled to turn over its new 500-ton mill in May. It is officially reported that ore reserves of positive and probable ore total 1,329,600 tons averaging 4.2% copper and 0.115 oz. gold per ton. Current work is being done in preparation for initial mining through ten transverse cut-and-fill stopes which will be silled out on the old 3,360 level. These stopes will be 10 meters wide and separated by 5-meter vertical pillars. As stopes are completed the pillars will be worked down by top slicing. In rebuilding the mill every effort was made to utilize old concrete, insofar as possible and safe. The mill buildings have been erected with structural steel frames and trusses. Much of the installed machinery consists of reconditioned units salvaged after the war, except when new equipment was needed to insure efficient operation. The compressor plant has been rebuilt with units to supply approximately 2,000 c.f.m. of air. The power plant will consist of two new 815 hp. diesel-generator units, with 500 hp. additional standby units.

AFRICA

Free State shaft nears reef—Tax relief urged for gold mines — Roan Antelope maintains reserves

★ One more step in the development of the Orange Free State gold field was taken early in March when diamond drills, operating in St. Helena's incline shaft, No. 3, cut the Leader and the Basal Reefs. The Leader was struck 60 ft. below the shaft bottom, and the Basal, 100 ft. down. This shaft, now down 1,990 ft. on a 30-deg. incline, was the first shaft to be started in the Free State. It was aimed at the sub-outcrop of the gold-bearing formation, and it will serve to get mine development under way. Main hoisting

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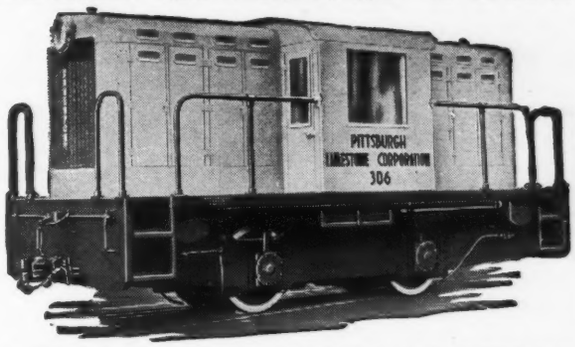

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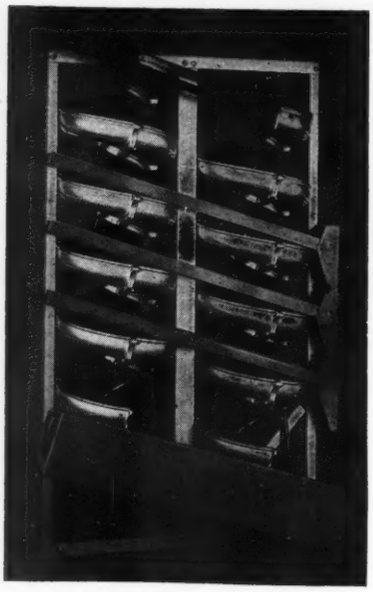

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AFRICA *(Continued)*

shafts for St. Helena will be vertical, and the incline will then serve only for ventilation. It is hoped to get the shaft itself down to the ore in another two months, but it will probably be another three years before real production begins .

★ Speaking at the annual meeting of the Transvaal Chamber of Mines on March 22, F. A. Unger, president, called for further sympathetic consideration by the Government of the special tax problems of gold mining. Further tax relief was needed, Mr. Unger felt, in view of "inexorably" rising costs. He said that the answer to rising costs was not mechanization, because several mining engineers sent to the United States to investigate mechanized mining there had returned with reports that United States' methods were not adaptable to South African mines, and that little could be done in the way of introducing new mechanical mining methods in Union mines. The best that could be hoped for, he said, was a gradual increase in effiicency in the mechanized methods already applied to South African mines. In regard to wage increases, for which the Miners' union is pressing, Mr. Unger said he did not think the gold mining industry could afford to grant them.

★ Gold production in January in the Transvaal was 992,185, oz., an increase over December's 976,693 oz. Working profits were estimated at 2,059,367, an average of 8s 8d per ton milled. The Rand's seven big mining houses show returns for the 24 working days of February generally lower than for January. Tonnage milled in February was 4,351,000 tons against January's 4,660,100 tons. Profits for February totaled 1,883,014; for January, they reached 2,107,300.

Transvaal sales and shipments of platinum in 1947 were 56,288 oz., worth £646,-676. Shipments in 1946 came to 55,490 oz. worth £531,551.

The estimated output of diamonds in the Transvaal province for 1947 was 43,-680 carats (from alluvials only) for 363,-952, against 57,212 carats, for 708,908 in 1946.

★ Considerable prospecting is taking place in the Tete district. Recent applications for mining licenses include: three for asbestos, six for uranium, and 20 for samarskite. The latter mineral (oxide of uranium, niobium, tantalum, iron, and lime) is found all over the Tete district.

★ Five seams of gold ore have been discovered at Maculue in the region of High Ligonha, Mozambique. An ore carrying 8% of uranium oxide is also reported. The Portuguese Government is one of the largest shareholders in the company reporting the finds.

★ Vanguard Asbestos Mines, Ltd., which has acquired extensive claims in the Belingwe district about 100 miles east of Bulawayo, has been registered in Southern Rhodesia. Total length of the company's strike is reported at 2½ miles, and the width, at one half a mile. Development work was begun at once. There is every indication that the mine will be a big one.

★In contrast with reserve figures for many of the copper mines of the United States, Roan Antelope's figures show continued richness of reserves. Total estimated ore reserves at June 30, 1947, amounted to 101,496,000 tons, averaging 3.40% copper. This compares with last year's figure of 102,395,600 tons at 3.42½ copper. The Nkana North orebody reserve has been increased by bringing in more undeveloped ore below the 2,370-ft. level, which more than offset depletion by mining. There is no change in the Nkana South reserve, but the Mindola reserve has been diminished by mining. At the end of last year, 5,674,200 tons of ore averaging 4.80% copper was ready for stoping, and another 19,410,300 tons averaging 3.69% was developed by main levels but not ready to mine. The rest of the reserves are included in ores proven by drilling and drifting.

INDIA

Pakistan to develop minerals—To study Baluchistan chromite—Burma has radioactive minerals

★Design for a new one-ton-daily pilot plant for production of phosphorus from rock phosphate has been completed by engineers of the Council of Scientific and Industrial Research. Cost sheets show that the plant would make amorphous red phosphorus for about 21c per lb. Capital outlay for the plant would by $90,000 for building and $60,000 for working capital. Present demand by Indian match factories and non-ferrous metallurgical plants is estimated to run between 200 and 250 tons annually, compared with pre-war requirements of only 150 tons a year.

★The large chromite deposits in Baluchistan and Kalat are among the reserves of Pakistan that will be studied. Present output of these ore-bodies is about 2,000 tons of chrome ore, which goes to British steel plants. India's requirements are 10,000 tons a year of chrome ore, and it may be possible to work out a plan to exchange Pakistan's chrome for India's iron.

★Two Indian States are planning to exploit some of their mineral resources. Tehri Garwhal, in the foothills of the Himalayas, is offering prospecting and mining leases covering gypsum deposits that lie close by a railway line. Baroda, on the west coast above Bombay, is seeking bidders for opening up its bauxite deposits.

★The Royal Institute of Science at Bombay has been working on a process to use celestite, from the extensive deposits located in Madras Province, to make strontium carbonate. The Madras deposits are said to contain about 1 million long tons.

★Officials of the new Pakistan Government, the Indian Moslem State, place great

stress on development of such mineral resources as the new Dominion possesses. According to I. I. Chundrigar, minister for industries and commerce, steps will soon be taken to engage American technologists to make a careful study of Pakistan's resources and suggest means for their development.

★Large deposits of uranium and thorium-bearing minerals are said to have been found in central and eastern Burma, according to Dr. Po Hla, secretary of the Burma Government industrial council. He returned recently to Rangoon after a survey trip, during which he discovered radioactive minerals in Yingyan District near the Burma Oil Co. fields, and in Thaten District near the Burma-Siam border. He also claims to have discovered platinum deposits in the upper Chindwin Valley and near Mytikyina in western Burma.

CZECHOSLOVAKIA

Iron ore output exceeds plan—Gold sought in old mining district

★Production of iron ore, Czechoslovakia's most important mining operation apart from coal, reached 1,400,000 tons in 1947. This was about 80,000 tons more than planned for the year, but it was still about 15% less than production in 1937. The monthly rate for the last four months of the year held at about 115,000 tons, although it had been expected that the winter weather and the holiday season would hold output down to about 100,000 tons for the last two months. Planned production for 1948 is 1,500,000 tons. High quality iron ore is still being imported into Czechoslovakia from Sweden. In November, for example, 150,000 tons, valued at 95,000,000 crowns, was imported.

★A conference between Polish and Czechoslovak mining experts took place recently in Ostrava. When the Czechoslovak-Polish trade agreement was signed in July, 1947, it was decided to set up a commission for industrial cooperation, including mining. This first conference was attended by the general manager of the nationalized Polish mines, a Mr. Topolsky, and by Ing. S. Rada, manager of the Czechoslovak nationalized mines.

★The Silesian Research Institute is continuing trial borings in Horny Benesov in Silesia. Gold and silver were produced here up to 1870, when the mines were closed as being unprofitable. The present work continues exploration begun by the Germans during the war.

★Production figures for the mining industry during the war years were released recently by the State statistical office. The figures show how output was stepped up to record levels during the war by exploiting the higher-grade veins and by use of large numbers of prisoners of war and slave laborers.

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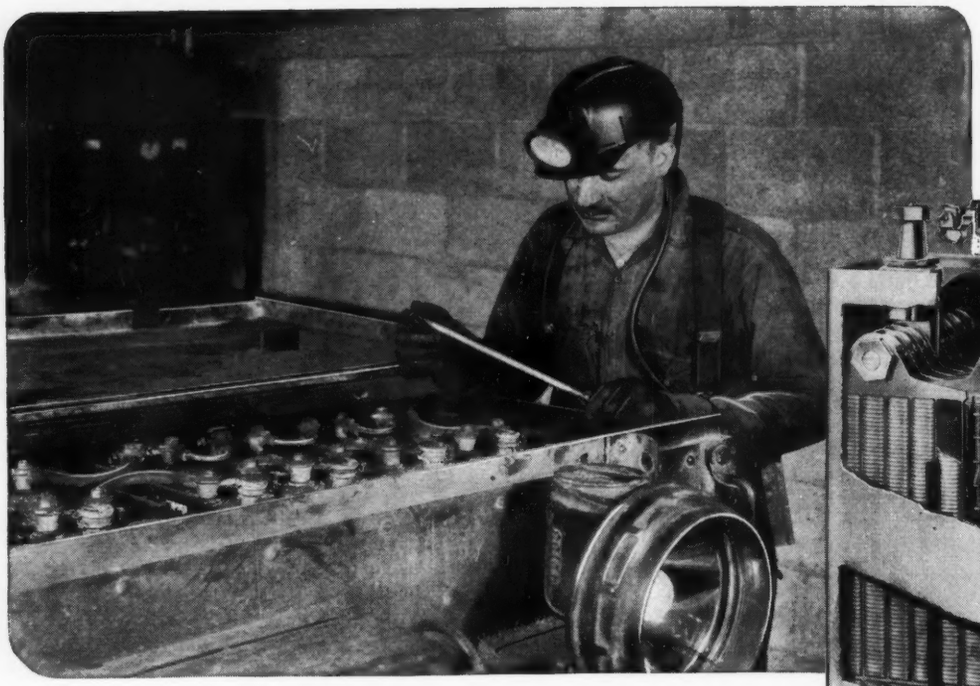

BELOW: cutaway view of typical EDISON cell used in mine haulage batteries.

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